



FRIDAY, APRIL 4, 1879.

### Machine for Cutting off and Piecing Locomotive Tubes.

In removing locomotive tubes from the boiler, it is necessary to cut the ends so that it is impossible to replace them thereafter without piecing out one end. A variety of methods are employed for doing this, but the machine illustrated above, which was designed and built by Mr. Jacob Johann, Master Mechanic of the Wabash Railway at Springfield, Ill., is perhaps the most effective contrivance for doing this work.

The spindle of the machine is made hollow, so that an ordinary two-inch locomotive tube may be readily inserted,

Harsimus Cove property at Jersey City, and build a new pier and grain elevator. The need of this is shown by the fact that the Pennsylvania, which last year only carried one-seventh of the grain received at New York during the first two months of the year, carried one-third during the corresponding period of 1879. On the old Navy Yard property in this city the company proposes to build the finest pier on the Delaware. Running out parallel with Reed street extended, it will have an extreme length of 500 ft. to the Port Warden's line. It will be 100 ft. wide, and, owing to the line running diagonally with the shore, a frontage of 108 ft. on the river. It will have covered sheds and will be used specially for the shipment of flour and provisions, so as to bring the facilities of the port for this class of export trade up to those already enjoyed by the grain trade. This will not only give the company these added facilities, but save the rental of private property. On the Philadelphia Division at Valley Creek the bridge will be improved and the sharp curve will be reduced. The Bedford & Bridgeport road, which now barely pays operating ex-

and seven-degree curve, and 82-ft. grade and four-degree curve. This will enable each locomotive to haul a load 25 per cent. greater, and the whole cost will not be more than \$85,000. Extensions are planned by the Pittsburgh, New castle & Lake Erie, the Foxburg, St. Petersburg & Clarion through Forest County to Kane, and the Pittsburgh, Virginia & Charleston to Brownsville. The surveyors are still engaged on the branch of the Philadelphia, Wilmington & Baltimore from Elkton, Md., to Middletown, Del., and a Company has been formed to construct a line from McKee's Rocks to Mansfield, Pa. The Reading is to lay two miles of track to bring its line to the Pennsylvania Steel Works. The Pennsylvania Company, which has hitherto run the Mansfield, Coldwater & Lake Michigan, has leased the line, as reorganized, for 99 years to the Grand Rapids & Indiana, to which it properly belongs, and in which the Pennsylvania Railroad has about a million and a half interest. The road will be completed as soon as possible from Mansfield, Ohio, through to Allegan, 225 miles. Its new name is the Alleghen & Southeastern.

FIG. 1.

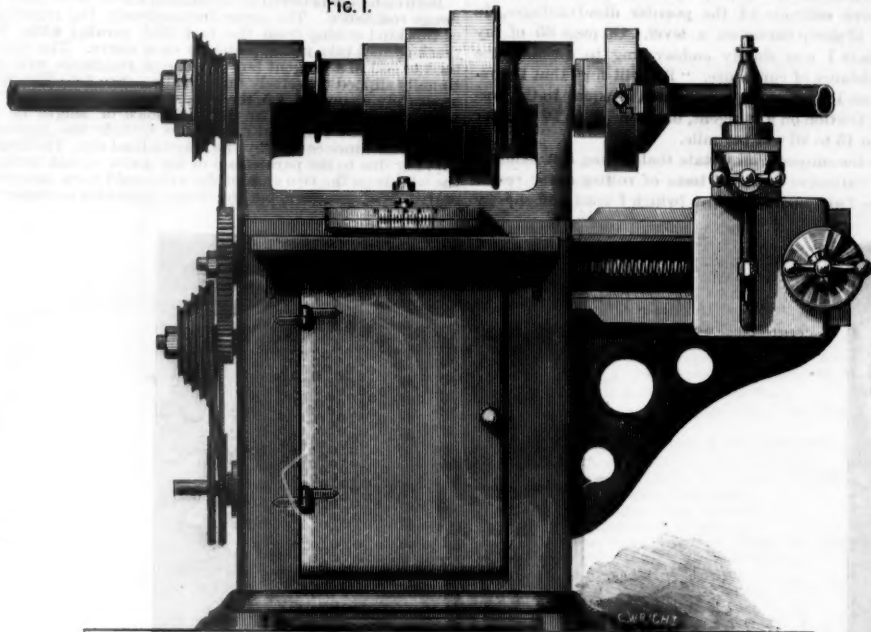


FIG. 2.

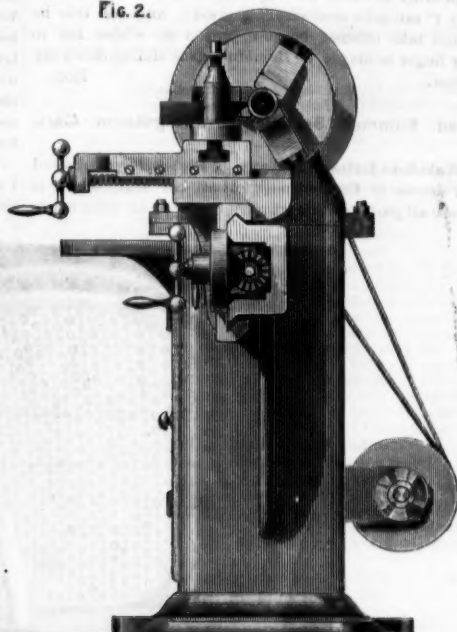


FIG. 3.

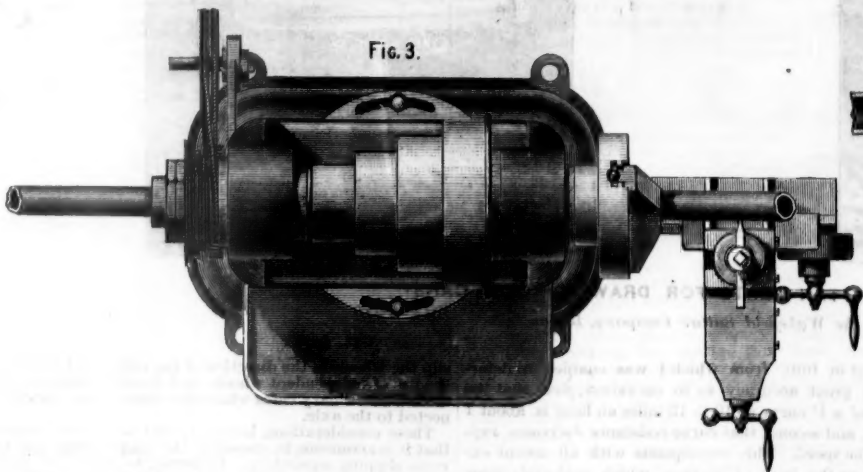


FIG. 5.

FIG. 4.



FIG. 6.

FIG. 7.



### MACHINE FOR CUTTING OFF AND PIECING OUT LOCOMOTIVE TUBES:

Designed by Jacob Johann, of the Wabash Railway, Springfield, Ill.

and it is then securely held by a chuck which forms the face-plate of the spindle. The tube is then cut off and the end turned tapered, as represented in section in fig. 4. Short pieces of a suitable length to lengthen out the tube are cut off in the same machine and the ends counter-bored, as shown in fig. 5, and the end is then flared out with a suitable tool, as shown in fig. 6. The end of the tube is then inserted into that of the piece, as shown in fig. 7, and the two are placed in a vertical position in a blacksmith's fire, and the two ends are brazed together where they fit into each other. The flared mouth of the piece of tube serves the purpose of holding the material used in brazing. In this way the tubes are rapidly cut off and the ends fitted on by a boy, and the accurate way in which they are thus made to fit each other secures a good and reliable joint of the two parts.

The construction of the machine will be apparent from the engraving without further description.

### Contributions.

#### Railroad Projects in Pennsylvania.

PHILADELPHIA, March 25.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The plans already made indicate that this will be a year of extensions for the leading railroads in this state. As indicated in its annual report, the Pennsylvania Railroad Company will alter, extend and enlarge the present piers on the

penses, to say nothing of interest on a debt of over a million, will be extended this summer to Cumberland, Md., and in time to West Virginia to tap the beds of ore in Hampshire and Grant counties. Surveyors are also at work on a proposed line for an extension to Long Branch of the Freehold & Jamesburg Agricultural road, one of the little sprawling lines of the United Railroads that never has paid since it was built. The land damages will be heavy and the line may not be built, but the Pennsylvania does not want to see Long Branch bottled up by the New Jersey Central any longer, especially since that road now controls the New Jersey Southern and thus has both routes. The idea is to run nearer the sea than the present line. The Southwest Pennsylvania, which is leased to the Pennsylvania, will also construct a branch from Fairchance, near Uniontown, to Morgantown, West Va. The West Jersey, another of the Pennsylvania's lines, will also be extended to Sea Grove, the extreme end of Cape May, which has hitherto been reached only by horse-cars from Cape May. The route will be almost at right angles with the present line, which runs direct to the beach. The Superintendent, General Sewell, will find the work done when he returns from Europe three months hence. The Lehigh Valley contemplates the construction of a branch from Hawley to Pittston and a relocation of the track between Penn Haven and Black Creek Junction. The line now has curves of fourteen degrees and grades of 95 ft. Mr. Sayre, the Superintendent and Engineer, proposes to reduce these so that there will be nothing worse than a 55-ft. grade and nine-degree curve, 65-ft. grade

### The Order Against Drinking.

TO THE EDITOR OF THE RAILROAD GAZETTE:

"M." comes at me full tilt, in the good old medieval fashion, with, perhaps the substitution of a goose-quill for a lance, and puerile argument for armor, essaying with one flourish of his prod and prowess to administer a *coup d'état*, and to this end, resorts to the childish trick of setting up a straw man of his own manufacture for the consolation it seems to afford him in knocking it over. This is self-evident from his reply, inasmuch as that he premeditatedly ignores the fact that I was not advocating the use of intoxicating liquors in the slightest measure, and, to allay all uncertainty upon that point, plainly prefaced my former communication with that assertion. Yet, notwithstanding all this, "M." makes bold to blaze away at me from the hypothesis that I am a swashbuckler of intemperance, and from out the vasty somewhere of his composition fishes up the indisputable (?) conclusion that I am "not posted." That settles it! At least in his opinion. But, *adhuc sub judice lis est*. Perhaps when he reads the article in question again, he may become cognizant of the fact that my criticism was not directed at the object of the order referred to, but at the petty arrogance of the spirit which pervaded it.

It is just as easy, and a hundred times more manly, to speak kindly as it is to assume a Sir Oracle air of dictatorial greatness, and, mounting the pedestal of conceit, proclaim in shoddy dignity, "I am the Boss!" And any one, I don't care



whether he be superintendent of a railroad or of some private or civil enterprise, who seeks to make those whom circumstances may chance to place lower in the scale of authority than he, feel the miserable distinction between "I" and "thou," is intellectually dishonest and cowardly.

Lest my sarcastic adversary, "M.," should again put his aggressive prod in my eye and accuse me of advocating the abrogation of rank (what a chance for a pun) and position in railway or other service, let me contradict the supposititious accusation by stating plainly that the only thing I have sought to criticize or discountenance in the least is the contemptible spirit of bigotry which rises like scum on the mud-puddle of authority here and there, and only hope I have stated the matter with due ferocity to enable some one or more of these apes who stand making mouths in the glass of time to catch a glimpse of themselves as others see them. And, furthermore, not the slightest personality is mingled with this twaddle, except, perhaps, in reference to the intentional misconstruction "M." placed upon the first communication in order to catch me "upon the hip" of his sarcastic seniority ("sarcastic seniority" is good!), and for this he should not take offense, because, unless he wishes me to stick my finger in his pie, he shouldn't come sliding down my cellar-door.

Rox.

#### Improved Summer Seat for Drawing-Room Cars.

The Wakefield Rattan Company, of Boston, have followed up their success in the ordinary rattan car seat, which is now in use all parts of this country, as well as upon many

#### The Measure of Curve Resistance.

CLEVELAND, O., March 10, 1879.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Your correspondent "B." in your current issue quotes me as estimating the resistance of curvature, in my treatise on location which appeared in your columns, at very much higher figures than are usually given, viz.: for a 10° curve, "nearly 28 lbs. per ton for trains of empties, and 15½ lbs. per ton for trains of loaded cars."

Allow me to call "B.'s" attention to the fact that this estimate was distinctly stated to be made for a special purpose viz.: (see page 171) "to determine the degree of the curve which in all cases and under the most unfavorable circumstances will oppose no greater resistance on a level to the longest and heaviest trains than the resistance from gravity only on the maximum grade," my object being to point out the folly of fixing a certain low limit of curvature (say 6° curves) as an arbitrary maximum which may be freely used on the maximum grade, and yet may not be exceeded on a level. It is clear that, for this purpose, prudence required a very excessive estimate of the possible disadvantages, in some cases, of sharp curves on a level. On page 35 of my treatise, where I was simply endeavoring to estimate the average resistance of curvature, "B." will find that the resistance of an 11° 20' curve is estimated as equal to the normal rolling friction on a tangent, or from 6 to 10 lbs. per ton, or from 15 to 26 feet per mile.

While on the subject I may state that during last summer I made an extensive series of tests of rolling-stock resistances on the Lake Shore Railway (which I trust will shortly

difference in the curve resistance of 4-wheel trucks (5 ft.), and 6-wheel trucks (11 ft.) that it was almost imperceptible.

A. M. WELLINGTON.

#### The Elements of Curve Resistance.

[Remarks of Mr. Charles E. Emery at a discussion of a paper on the "Theoretical Resistances of Railroad Curves," by the American Society of Civil Engineers, June 5, 1878.]

Mathematical discussions are of great value in enabling the well-understood relations of simple physical phenomena to be grouped together to determine approximately questions of a higher order, and the resulting expressions in turn suggest the direction of investigations whereby the constants in the equations may be corrected, and the experiments thereby be comprehensively utilized.

The paper of Mr. Whitney under discussion is of great interest, and shows evidences of thought and careful preparation. In my opinion, however, he has omitted two elements of curve resistance and overestimated a third, while two other elements, separately treated in his paper, so modify each other that they should be jointly considered. The various modifications to some extent balance each other, but all are essential to a complete examination of the subject.

Both elements believed to be omitted affect principally the flange resistance. The paper discussed only the resistances of this kind arising from the fact that parallel axes in a truck cannot take radial positions on a curve. The wheels tend to roll in a tangent but by flange resistance are continually slipped transversely on the rails. (See § 6.) The paper separately estimates, § 5, the resistance due to slipping the wheels the distance due to the difference of length of the inner and outer rails, but neglects to include the increased flange resistance caused by the longitudinal slip. The inward slipping due to the parallelism of the axles would occur if the wheels on the two ends of the axle could turn independently one of the other, but the flange resistance necessary to



IMPROVED RATTAN SEATS FOR DRAWING-ROOM CARS.

By the Wakefield Rattan Company, Boston.

foreign railroads, with a chair to be used in drawing-room cars during the summer season. The cuts above give the two patterns now offered. They may be used upon the same base as the ordinary plush seats, and, being always free from dust, cool, comfortable, and very durable, are desirable to passengers, to the owners of cars and to employes.

The natural finish of the rattan which is bright, clean and not liable to fade like plush or tarnish like metal, its hard silicate surface rendering it impervious to heat or dust, and the well-known elasticity of the material should bring this new seat into as much favor among travelers as their popular chairs for the house now enjoy among people all over the country.

Samples of these chairs may be seen at No. 8 Park place, New York, and at No. 231 State street, Chicago, and at the company's head-quarters No. 115 Washington street, Boston.

#### The Rogers Double-Ender.

Rogers Locomotive and Machine Works,  
PATERNON, N. J., March 28, 1879.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your issue of this date I notice, in your description of double-end narrow-gauge tank locomotive for the Matanzas Railroad, an important error. Quotation, beginning near the middle of ninth line: "The front part of the engine frame is made of the ordinary form, with a wooden bumper timber bolted to it at the front end. At the back end it abuts against a transverse bar or cross-piece, which is fastened to the front of the fire-box."

I have italicized the part that is erroneous. The cross-bar or piece is not fastened to the front of the fire-box at all, but is fastened to two longitudinal pieces extending along each side of the fire-box, being secured thereto by expansion plates very much in the usual manner.

We have not yet learned how to secure the frames of locomotive to boilers at both ends without provision for expansion.

W. S. HUDSON, Superintendent.

be published in full), from which I was enabled to determine with great accuracy as to curvature, first, that the resistance of a 1° curve at 10 to 18 miles an hour is about 1 lb. per ton, and second, that curve resistance decreases rapidly with the speed. This corresponds with all recent experiments on the laws of friction, which uniformly show that the co-efficient of friction decreases rapidly with the speed and that this decrease is by far the most rapid at minute velocities (e. g., see editorial on the Westinghouse brake experiments in the Gazette of Feb. 21). From this it appears probable, in fact almost certain, that the co-efficient of the most important elements of curve friction, viz., the sliding on the surface of the rail, will decrease rapidly with the sharpness of the curve, the speed of the vehicle being the same, on account of the greater velocity of the sliding surfaces upon each other. On the other hand, the co-efficient of flange friction is probably greater on sharp curves, but this latter element is so comparatively unimportant as to throw grave doubts on the correctness of experimenting on sharp curves, from 90 to 400 feet radius, and deducing therefrom a general co-efficient of curve resistance per degree of curvature. It appears probable that the curve resistance per degree of very sharp curves may be much less than for curves of longer radius.

These views are supported by the French experiments on curve resistance which Mr. O. Chanute gives in an article which you also reprint in your current number. These experiments show a curve resistance of 1 lb. to 1½ lbs. per ton for easy curves at speeds of 15 to 16 miles per hour. Mr. Chanute calls attention to the fact that these experiments were on 4-wheel rolling stock with long wheel-bases, but the difference between the curve resistances of long and short wheel-bases is very much less than is ordinarily supposed, owing to the rarely considered facts ably pointed out by Mr. Chas. E. Emery\* in a discussion accompanying that of Mr. Chanute which you reprint. I may also mention that I found, in the experiments above referred to, so slight a

slip the wheels in the direction of the rail would be saved by the use of independent wheels, and should, therefore, be included in ordinary cases where the wheels are rigidly connected to the axle.

These considerations, however, lead us to the conclusion that it is erroneous to consider the longitudinal and transverse slipping separately. Referring to fig. 1, let  $RR_1$  and  $SS_1$  represent curved rails;  $OA$  and  $OA_1$  two radii of the curve, and  $BC$  and  $B_1C_1$  the positions of the leading axle of a truck corresponding to such radii, then it is evident that as the system moved through the angle at  $O$ , the wheels at  $B$  and  $C$  would tend to roll in parallel lines to the points  $B_1$  and  $C_1$ , but would be forced to move to the positions  $B_1$  and  $C_1$ . That is,  $B$  would be forced inward a distance  $B_1B$ , and forward a distance  $B_1B_1$ , so the actual slip would equal the diagonal  $B_1B$ . At the same time  $C$  would be forced inward a distance  $C_1C$ , and backward a distance  $C_1C_1$ , so the actual slip of the inside wheel would equal the diagonal  $C_1C$ . Differences in the distribution of the weight will affect the relative amount of slip on the two rails, but when the car is uniformly loaded on the two sides and the superelevation of the outer rail, that due to the speed, the slip should be as per diagram. Corresponding modifications of Mr. Whitney's formula will be submitted when his paper is accessible in print.

In this connection it is suggested also, that probably formula (4), § 4, could also be included in the same expression, as the problem of twisting each wheel, or practically a short cylinder on the rail through a given angle, is much the same as slipping two connected wheels, or practically a long cylinder through the same angle.

The second element of resistance neglected is that required to turn the car through the angle from one tangent to the other. If we suppose a car body supported on a single truck, and propelled on a curve by force applied to the truck itself, the whole mass will develop the centrifugal force discussed in § 1 of the paper. The car body would not, however, change its angle in space, but remain in all positions on the curve parallel with its original position. (See fig. 2.) Under the conditions of practice, then, force must be applied to revolve the car body through the angle named. If the body be fast to the frame carrying the wheels, as in short cars, the angle of the whole mass must be changed on a centre passing through the rear axle, and the force required to make the change causes extra resistance on the flange of the outer leading wheel. In a car with two trucks each must be revolved by the leading wheels as before, but the car body will be turned by the leading truck, on the after truck as a centre. The leading truck of a locomotive makes high speed possible with increased safety and a reduction of resistance, as the

\* Published in this number of the Railroad Gazette.—EDITOR.



mass is piloted around the curve and its angle changed by force applied well forward of the centre of gyration, in relation to the after rigid wheel-base. Similar advantages are obtained with our American double bogie cars. In cars with the body fast to the frame carrying the wheels, as in street cars, the front wheels generally fall inside the centre of gyration of the mass to be revolved, and with the corresponding loss of leverage the flange resistance is materially increased. The force required to turn the car is in any case evidently too important to be neglected.

I must disagree with the author that the tractive efforts transmitted from one car to another on a curve, are reduced at each car in the proportion of the cosine of the exterior angle of the funicular polygon, to radius. (See § 8.) It is simply the problem of deflecting a force, as is done when a rope under strain is wound round a pulley; the train being practically a chain for transmitting power. A lateral force is developed in changing the direction represented approximately by the sine of the angle referred to (or) a fraction of the angle. (See equation 10.) But this force is not expended, except so far as it produces friction on the flanges and the shoulders of the axles.

In respect to coning the wheels, I would state that some years since, when riding at a high rate of speed on the Erie Railroad, I observed that the car ran from side to side of

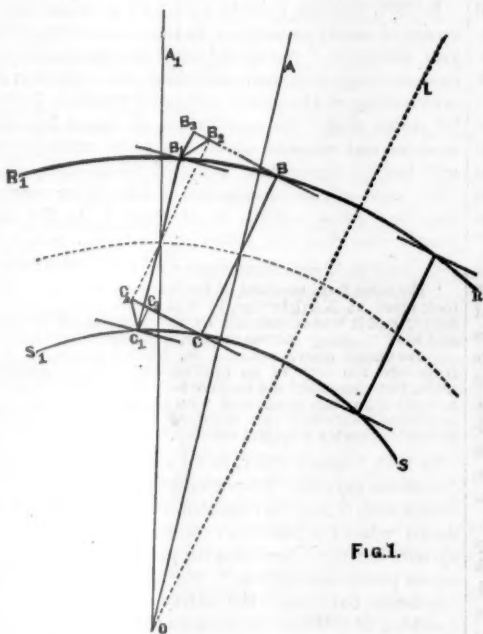


FIG. 1.

the track, bringing up with a jolt against the flanges. This was attributed at the time to coned wheels, and it is probable that slight curves and other causes were sufficient to start the car in a sidling movement, which the coning of the wheels maintained in accordance with the ordinary principles of vibration. The effect of insufficient elevation of the outer rail is plainly observable on the Baltimore & Ohio Railroad. The track being regulated for coal traffic, in many places the cars of express trains are thrown violently against the outer

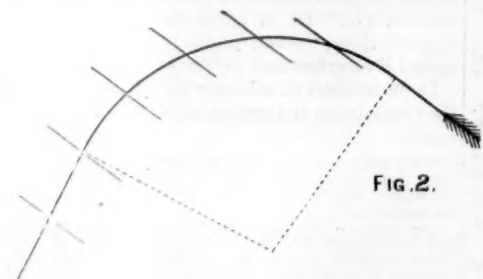


FIG. 2.

rail, and rebounding, are thrown out again and again, producing very unpleasant sensations.

The contradictory results of experiments on curve resistance are probably due, in most cases, to changes of speed on the curve. While the speed is slackening, the dynamometer will show less strain than is due to the actual resistance; the reduction of the *vis viva* of the mass developing a propelling force; while, if the engine is worked harder, for the moment, the indications of the dynamometer will be in excess of the true curve resistance by an amount corresponding to the increase of speed. Some want of correspondence among results with the dynamograph I could only explain in this way. No dynamometer experiments can be entirely reliable unless conducted in connection with a velocimeter, by means of which either the speed may be regulated, or proper corrections made afterward in the results. Marking the time at intervals on the dynamometer diagram or a sheet of paper, traversed by the train, is not sufficient. A continuous register of the velocity is necessary.\*

\* In the above connection, I will state that in testing the resistance of street cars recently, I found that the customary springing forward of the horses on approaching a curve entirely vitiated the results, and no satisfactory records could be obtained until the cars were tried on a sharp curve and steep grade, where a hard, steady pull was necessary. A practically uniform velocity of approach was obtained by stopping each car six feet before the beginning of the curve. The experiments appeared to show that the mean tractive effort required to propel a street car at a slow speed on the level, is 11.8 lbs. per ton. Wheels 30 in. in diameter; journals  $2\frac{1}{2} \times 6$  in., weight of car, empty, 4,500 lbs. The resistance on a level curve of 40 ft. radius was for rigid wheels 53.57 lbs. per ton of 2,000 lbs, and for independent wheels 34.03 lbs. per ton, making the saving in total resistance, due to the use of the latter, 36.48 per cent. Deducting from each 11.8 lbs. the resistance on a straight line, the saving in curve resistance proper was found to be 46.78 per cent.

#### International Road-Masters' Association.

[Minutes of adjourned meeting of road-masters, held at Young's Hotel, Boston, March 25, 1879.]

The meeting was called to order by the President at 1:10 p. m., who then called for the reading of minutes of meeting

held at Greenfield, Mass., Feb. 6, 1879, which the Secretary proceeded to read.

"MANSON HOUSE, Greenfield, Mass., Thursday, Feb. 6, 1879.

"Meeting called to order by L. J. Spaulding, who gave a brief outline of the object of the meeting, stating that he considered it of great benefit to road-masters and to the roads they represented to have an organization where their views and opinions may be expressed to the advantage of all, and that was, as he understood it, the object of calling this meeting.

"On motion, Mr. L. J. Spaulding was elected President, and George T. Wiswell, Secretary. It was also voted that a committee of five, including President and Secretary, be appointed to prepare a constitution and by-laws for the Association, to be presented at the next meeting. The President appointed on that committee J. R. Patch, R. Hyland, J. W. Shanks.

"On motion, it was voted to call this the "International Road-Masters' Association."

"On motion, it was voted to hold the next meeting at Young's Hotel in Boston, March 25, 1879, at 1 o'clock p. m.

"The Secretary was instructed to have notices printed and sent to every road-master and assistant road-master in the United States and Canada, informing them of the organization and place of holding next meeting, the expense attending the same to be paid by the Association by assessment or otherwise.

"Letters were received by the Secretary from several road-masters, regretting their not being able to be present at this meeting, but tendering their hearty support and cooperation.

"Remarks were made by Messrs. Hyland, Clark, Bishop and others.

"On motion it was voted to adjourn to meet in Boston, at Young's Hotel, March 25, 1879, at 1 o'clock p. m.

"Attest, GEO. T. WISWELL, Secretary."

The President then called for report of Committee on Constitution and By-Laws, which was presented by the Secretary, and, with some slight changes, was adopted.

It was then announced that dinner was ready, and a motion was made and carried, without opposition, to take a recess of one hour for dinner, and about thirty sat down to a sumptuous dinner to which most of the hearty road-masters did justice. At 3 o'clock the meeting was again called to order by the President, who stated that, as there was a number present that wanted to get away in the early evening trains, it would be necessary to hurry business along as fast as possible.

The next in order was enrollment of members, and the following persons signed the constitution and by-laws, paid the required fee, and were voted members of the International Road-Masters' Association:

J. W. Kennaday, Jeffersonville, Madison & Indianapolis Railroad.

L. A. Jacobs, New York & New England.

J. W. Alsop, Atlantic & Great Western.

Robert French, Atlantic & Great Western.

R. Hyland, Cheshire Railroad.

George W. Wagg, Main Central.

E. Morrell, Boston & Maine.

W. H. Elton, Boston & New York Air Line.

Daniel P. Hill, Boston & Providence.

George Nevins, Maine Central.

G. R. Hardy, Boston & Albany.

J. S. Lane, Housatonic Railroad.

L. D. Colling, Danbury & Norwalk.

R. A. Eaton, Concord Railroad.

A. A. O'Rourke, Quebec Central.

L. B. Ball, Nashua & Lowell.

W. P. Burbank, Portsmouth Railroad.

Chas. S. Slaffter, Boston & Providence.

Geo. W. Terry, Maine Central.

A. C. Stevens, Eastern Railroad.

W. E. Clark, Vermont Valley.

John R. Patch, Connecticut River Railroad.

Geo. W. Bishop, Fitchburg Railroad.

T. J. Dickey, Fitchburg Railroad.

E. H. Bryant, Old Colony Railroad.

E. W. Hosmer, Central Vermont, Rutland Division.

J. B. Whitney, Eastern Railroad.

A. C. Beene, Central Vermont.

L. J. Spaulding, Fitchburg Railroad.

Geo. T. Wiswell, Troy & Greenfield Railroad.

G. C. Shanks, Canada Central.

E. R. Morse, Montpelier & Wells River.

Patrick Dee, Ashuelot Railroad.

The Secretary then announced that he received some seventy-five letters from road-masters that were not able to be at this meeting, but assuring us of their hearty support. Among them were some who desired to have their names enrolled as members of the Association. A motion was then made and carried that the Secretary sign the names of those requesting it to the constitution and by-laws, and that upon the payment of the required fee of one dollar they become members of the "International Road-Masters' Association," and the following names were enrolled by the Secretary:

John Tracy, Western Union.

John Barry, Wilmington & Weldon Railroad.

D. W. Briggs, Western Union Railroad.

F. Fanning, St. Joseph & Denver City.

Wallace McGrath, Scioto Valley Railroad.

T. Cavanaugh, Southern Minnesota Railway.

F. X. Galarneau, Toledo, Peoria & Warsaw.

N. E. Bradley, Allegheny Valley.

H. A. Sumner, Burlington & Southwestern.

J. Doyle, Detroit, Lansing & Northern.

J. C. Rann, St. Louis & Southeastern.

The President then announced that the next business in order was to proceed to the election of officers, and the following were decided elected:

President, L. J. Spaulding.

First Vice-President, J. W. Kennaday.

Second Vice-President, J. W. Alsop.

Secretary, Geo. T. Wiswell.

Treasurer, G. R. Hardy.

Executive Committee—Geo. Nevins, J. W. Shanks, J. S. Lane, A. C. Beene, R. Hyland.

These, together with President and Secretary, make the committee of seven. After the election of officers there was some discussion as to time and place of holding next meeting. The second Wednesday in September was decided to be the best time of year for holding the annual meeting, as at that season the track is generally in the best shape; therefore it would be the best time for road-masters to get away. There seemed to be a wide disagreement as to the best place for holding the next annual meeting, so much so that a motion was made and carried to proceed to ballot for place best to hold the next annual meeting. The place receiving the most votes, and accepted, was Niagara Falls.

On motion, it was voted that, as the second Wednesday in September was to be the time for holding the annual meeting, Article 3, Section 1, of the constitution and by-laws be so amended as to read, "second Wednesday in September," instead of "fourth Tuesday in March."

On motion, it was voted that the Executive Committee

procure some good, practical railroad men to address the next meeting. Mr. Charles Latimer was spoken of as one, if he could be induced to come. It was also suggested that each member of this Association collect as much information as possible that would be of interest to this Association, and be prepared to present it at the next meeting. This being the first meeting, or rather organizing meeting, it would hardly be expected that many present would be prepared or have time to get up much discussion on railroad matters pertaining to road-bed and track. Motion was made and carried unanimously that the members of this Association tender a vote of thanks to the proprietors of this hotel, Messrs. Hall & Whipple, for the kind manner in which they have all been entertained.

On motion, it was voted to adjourn the meeting, and at 7:30 o'clock the meeting adjourned.

Attest, GEO. T. WISWELL, Secretary.

#### Constitution of the International Road-Masters' Association.

##### PREAMBLE.

We, the undersigned road-masters, for the purpose of securing more perfect harmony, imparting more general information, and promoting the general welfare of each other and the roads we represent, form ourselves into an organization and frame the following constitution and by-laws:

##### ARTICLE 1.

SEC. 1.—The name of this organization shall be the International Road-Masters' Association.

##### ARTICLE 2.

SEC. 1.—The officers of this Association shall be a President, two Vice-Presidents, Secretary, Treasurer, and Executive Committee of seven, including President and Secretary; the President shall be Chairman of the Executive Committee.

SEC. 2.—All the officers shall be elected by ballot at the annual meeting. A majority of all votes cast shall be necessary for a choice.

SEC. 3.—The President, or, in his absence, one of the Vice-Presidents, in order of election, shall preside at all meetings. In case of the absence of both President and Vice-Presidents, the members present may elect a President to act *pro tem*.

SEC. 4.—The Secretary shall keep the records of the Association and Executive Committee, conduct all correspondence, and issue notice of all meetings of the Association and Executive Committee, and collect all fees and dues and pay them over to the Treasurer, taking his receipt therefor.

SEC. 5.—The Treasurer shall keep the accounts and be charged with all the funds of the Association and disburse them under the direction of the Executive Committee, and shall at the annual meeting, or at any other time if required by the Executive Committee, furnish a statement of funds, income and expenditures of the Association.

SEC. 6.—All bills against the Association must be approved by three members of the Executive Committee before they shall be paid.

SEC. 7.—The Executive Committee shall have the general management of the Association. Three members of this committee shall constitute a quorum at any regular meeting of the committee.

SEC. 8.—Vacancies may be filled *pro tem*, by the President, or permanently by a majority vote of the members present at any regular or special meeting.

SEC. 9.—All officers of the Association shall continue in office until their successors are elected.

##### ARTICLE 3.

SEC. 1.—The regular annual meetings of the Association shall be held on the second Wednesday of September. Special meetings may be called by the Executive Committee or by vote of the members at any regular or special meeting. Fifteen members shall constitute a quorum of all meetings of the Association.

SEC. 2.—The order of business shall be as follows:

1. Reading of minutes of last regular and intervening meetings of the Association.
2. Enrollment of new members.
3. Reading communications.
4. Election of officers.
5. Report of committees.
6. Unfinished business.
7. Miscellaneous business.

SEC. 3.—The place of holding next annual meeting shall be decided by a majority vote of the members present at each annual meeting.

SEC. 4.—The place of holding special meetings shall be decided by a vote of members present, or by the Executive Committee, of which all members shall receive due notice.

##### ARTICLE 4.

SEC. 1.—Any road-master or assistant road-master in good standing on a regularly operated railroad, on securing a majority vote of members present and signing the constitution and by-laws and paying an entrance fee of one dollar, shall become a member of this Association, and shall remain a member so long as he pays all dues and assessments promptly, unless expelled.

SEC. 2.—Whenever the fees shall prove insufficient for the current and necessary expenses of the Association, then the Executive Committee shall cause a further assessment to be levied on each member, the whole to be approved by a majority vote of the members present at any regular or special meeting.

SEC. 3.—Every member of this Association shall be notified by the Secretary, at least two weeks before the annual meeting, of the amount of his assessments, and if he shall fail to pay the same on or before the next annual meeting, he shall then cease to be a member of this Association until his dues and assessments are paid, or remitted by a vote of members at any regular or special meeting.

SEC. 4.—Any member may be expelled from this Association by a two-thirds vote of the members present at any regular or special meeting.

##### ARTICLE 5.

SEC. 1.—Any portion or the whole of these by-laws may be amended or others substituted instead by a two-thirds vote of all members present at any regular or special meeting of the Association.

#### Too Much for the Drummer.

According to the Cincinnati *Enquirer* a lady was sleeping in a berth on a Western railroad, with one hand hanging peacefully out over a loop in the curtains. A Cincinnati drummer thought he would have some fun, and seized hold of the hand and shook it most cordially, remarking as he did so: "Good-by, old boy, good-by; can't be with you always, you know; give my love to the folks and don't fail to call and see us when you come to town." Here the facetious drummer was knocked clear across the car by a stalwart blow from the disengaged hand of the occupant of the berth. After picking himself up and pulling his nose around to its proper place, he offered to bet a week's salary that the fellow in the berth was a prize-fighter. This excited some curiosity on that point, and the berth was closely watched. Susan B. Anthony turned out of it in the morning.





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## CONTENTS.

ILLUSTRATIONS:	Page.	GENERAL RAILROAD NEWS:	Page
Machine for Cutting off and Piecing Locomotive Tubes.....	181	Meetings and Announcements.....	188
Rattan Seats for Drawing-Room Cars.....	182	Elections and Appointments.....	188
Curve Diagrams.....	183	Personal.....	189
CONTRIBUTIONS:		Traffic and Earnings.....	189
Railroad Projects in Pennsylvania.....	181	The Scrap Heap.....	189
The Order Against Drinking.....	181	Old and New Roads.....	190
Improved Summer Seat for Drawing-Room Cars.....	182	ANNUAL REPORTS:	
The Rogers Double-Ender.....	182	Memphis & Charleston.....	191
The Measure of Curve Resistance.....	182	Wabash.....	192
The Law of Friction and the Westinghouse-Galton Experiments.....	187	St. Louis, Kansas City & Northern.....	192
EDITORIALS:		Chicago & Eastern Illinois.....	192
The Interlocking Switch and Signal System.....	184	MISCELLANEOUS:	
Three Chicago Railroads.....	185	Elements of Curve Resistance.....	182
St. Louis Freight Movement.....	186	International Road-Masters' Association.....	183
Record of New Railroad Construction.....	187	Constitution of the International Road-Masters' Association.....	183
EDITORIAL NOTES.....	187	Proposed Method of Corporation Taxation in New York.....	183
		Weighing Cars of Lumber.....	188

## EDITORIAL ANNOUNCEMENTS.

**Passes.**—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

**Addresses.**—Business letters should be addressed and drafts made payable to THE RAILROAD GAZETTE. Communications for the attention of the Editors should be addressed EDITOR RAILROAD GAZETTE.

**Advertisements.**—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

**Contributions.**—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

## THE INTERLOCKING SWITCH AND SIGNAL SYSTEM.

Last week some comments on the accident on the New York Elevated Railroad, at the Forty-second street junction, were published in the *Railroad Gazette*. We then felt no hesitation in expressing the opinion that the accident would not have occurred if an efficient system of interlocking switches and signals had been in use at that place, and no evidence has since been made public to change that conviction. Since then the board of directors have held a meeting, and have adopted the following resolutions:

"WHEREAS, the system of running through trains over main and branch lines necessarily involves crossing tracks at junction points, and whereas, no known system of switches and signals at crossings can secure perfect security, which must depend upon such signals being observed, understood and obeyed by employees, and whereas, the consideration of absolute safety to passengers should be paramount to all other considerations, therefore,

"Resolved, That from this date through trains shall be run only upon the main line, and all branches shall be operated independently.

"Resolved, That the officers of the company are hereby directed to carry this order into immediate effect.

"Resolved, That the Purchasing Committee, with the Chief Engineer and Consulting Engineer, are directed to provide as soon as possible, at junction points, suitable platforms and conveniences for the transfer of passengers between main line and junction trains, and that until such arrangements for transfer are made the operation of such branches shall be suspended."

It will be observed that the resolutions contain some very broad generalizations, and they illustrate how readily people will assent to resonant words when a careful analysis of their meaning might show that the latter was not strictly true.

Thus, the proposition that "the consideration of absolute safety to passengers should be paramount to all other considerations" sounds well—it appears humane and prudent in the highest degree; and yet it is not true. If it were, then no railroad could be oper-

ated at all, because absolute safety is not attainable. In operating railroads a high degree of safety to passengers should be paramount to nearly all other considerations but if the resolution had been worded in that way, probably the directors of the New York Elevated Railroad would not have drawn the deductions they did from this general proposition. Of course "no known system of switches and signals at crossings can secure perfect security," and it is also true that "perfect security" "must depend upon such signals being observed, understood and obeyed by employees," so that if it is admitted that signals may be unnoticed or misunderstood or disobeyed, and if "absolute safety" is "paramount to all other considerations," then the directors of the New York Elevated Railroad are entirely logical in the conclusions they have reached and announced.

But if we apply the same reasoning to some other conditions which exist on that line, and, in fact, on all other railroads, it will lead to some awkward conclusions. It is just as important that the signals governing the movement of trains running on the same track and in the same direction should be "observed, understood and obeyed" in order to insure "perfect security," as it is at a junction or crossing. Now, if "absolute safety to passengers should be paramount to all other considerations," then it would follow that two trains should never be run on the same track at the same time. The trouble is that "absolute safety" is, like nearly all other absolute things in human affairs, but especially in the operation of a railroad, impossible, and is not "paramount to all other considerations." The lives of passengers must be exposed to more or less danger, and risks must be taken, otherwise railroads cannot be operated at all. These risks should, of course, be reduced to the minimum consonant with the purposes of the railroad. The exact nature and limit of such purposes we will not attempt to define; but in the present case the transportation of some 70,000 people per day is one of the obvious purposes of the road referred to.

Whether the New York Elevated Railroad Company will be able to operate its line with greater or less risk to its passengers by working all its branches independently will not be discussed here now; but, in view of some of the opinions expressed by the President of that line, and owing to the general absence of knowledge among railroad managers in this country of the nature, objects and uses of the system of interlocking switches and signals, a little consideration of the advantages of that system may be of interest and use to many readers.

In an interview of a reporter of one of the daily papers with the President of the New York Elevated Railroad, he was asked:

"What do you think of the interlocking switch and signal system which the Metropolitan company claim is a means of obtaining perfect safety?"

"There is no safety in it," said Mr. Field, emphatically. "Whenever trains are to cross each other's track on the same level there is danger of collision. Why, only a month ago you will find by referring to a file of the *Herald* that on the Pennsylvania Central Railroad, where they have this very system more complete and perfect than anywhere else in the world, a locomotive cut right through the middle of a train of cars. \* \* \* There is absolutely no such thing as perfect safety where trains cross on the same level."

As a mere abstract proposition, it is doubtless true that there is no such thing as "perfect safety" when trains cross on the same level, but it is equally true, as has been pointed out, that there is no such thing as "perfect safety" when two or more trains run on the same track in the same direction. If the gentleman quoted, when he says "there is no safety in the interlocking system," means that it does not increase enormously the degree of safety at junctions and other points where switches are used, then he holds opinions entirely opposed to those which the most experienced railroad engineers and managers have expressed after the most deliberate and careful study, investigation and experience. With reference to the accident on the Pennsylvania Railroad which is quoted, while it is true that an interlocking apparatus was used at the junction where it occurred, yet the two signals which admitted the trains to the point where they came into collision were not interlocked. If they had been, the cause which produced the collision could not have existed.

In a report made to the British Parliament by a "Royal Commission on Railway Accidents," in 1877, it is said that "the usual requirements of the inspecting officers of the Board of Trade as to the interlocking of points and signals have been complied with in 15,239 cases and neglected in 13,375." In other words, the British railroads have, at an expense of many thousands of pounds sterling, interlocked 15,239 signals. If "there is no safety in this system," then there has been, to say the least, a great waste of money there.

Some idea of the value at which the commission estimated the block and interlocking systems may be inferred from the following recommendation contained

in their report. Speaking of these systems, the report says: "In our opinion the time has come when compulsion ought to be resorted to in exceptional cases when remissness is apparent in this matter. We do not think it desirable, however, that this should be done directly by statute, and therefore we recommend that powers be given to the Board of Trade to require the adoption of the block system, and of arrangements for the interlocking of points and signals, or of either of these, upon any part of a line when the department considers such a change necessary for safety."

Appended to the same report is what appears to be a minority report, by the Earl De La Warr, in which it is said: "The interlocking of points and signals should be regarded as indispensable at all stations where there are sidings or junctions. In all such cases I am of opinion that its adoption ought to be made compulsory."

In 1871, Captain Tyler in his report enumerating the means of safety as applied to the experience of that year mentions "signal and point arrangements with modern improvements, including concentration and interlocking of the signal and point levers." In 1872, he states that "the application of block telegraph working and suitable signal and point arrangements with locking apparatus," as one of the means by which "the want of care or mistakes of officers or servants may, to a great extent, be obviated." In the same year he also gives the following instance, which is a parallel case to the accident at Forty-second street.

"The most fatal accident of the last year was that which took place at Kirtlebridge, in which ten passengers were killed; and it was occasioned by the mistake of a zealous and hard-working station-master, who, laboring under the disadvantages above referred to, himself turned a goods train into the way of an approaching express passenger train, but who ought not to have been under any obligation to work the points at all, and who could not, if the cross-over road points had been interlocked with the signals, have committed such a frightful blunder."

In 1873, Captain Tyler, in speaking of collisions at junctions, says the "proportionate number of such collisions will, it may be expected, be very materially reduced when the junction cabins are all properly fitted up with locking apparatus for preventing conflicts between points and signals." He also enumerates other appliances to increase the safety at such places. In speaking of collisions at stations and sidings he says, "The want of care, and the mistakes of officers and servants, may, therefore, to a great extent, be avoided by mechanical improvements: 1. by the establishment of block telegraph working and suitable signal and point arrangements, with locking apparatus."

In 1874, in reporting on 75 accidents under the head of collisions, he says "there were 26 cases of defective signals or point arrangements or want of locking apparatus, etc." Of 17 accidents at facing points he says of these, "seven probably would not have occurred if there had been proper locking arrangements."

In the minutes of evidence by which the report of the Commission is supplemented, Colonel Tolland is reported to have said:

"We know collisions from mistakes are constantly occurring, and the sole and only object of such interlocking of points and signals is to prevent the very best men from making mistakes."

CHAIRMAN—"The principal cause of accidents which you put under your first head, namely, mistakes of servants, which might be prevented by proper mechanical means, you consider to be the want in all cases of the points being interlocked with the signals?"

(COL. TOLLAND)—"Yes, so as to prevent men from making mistakes. I do not say that it will entirely get rid of the effects of negligence, but I think that it will do away entirely with that class of accident which is simply due to a man taking hold of the wrong lever and moving a lever which he should not move."

Lieut. Colonel Hutchinson testified that the principal causes of accidents to the public traveling on railroads were, first, "the overrunning of signals; second, the want of sufficient brake-power; and third in order would be defects in signal arrangements and the want of interlocking."

Mr. Findlay testified:

"If the interlocking system is worth anything at all, it prevents signal-men from making any mistake at a point of junction which can cause an accident."

It is hardly necessary to multiply this testimony, of which there is much more of a like character in the report referred to. To say that there is no safety in the interlocking system is flatly to deny the testimony of the ablest experts in England.

Mr. Field further stated that "No system of signals can insure safety where the track is so made that the trains can come in collision."

As all trains running on the same track in the same direction can, and often do, come into collision, it follows from this oracular proposition that no railroad can ever be safe with more than one train on it. If the managers of the New York Elevated Railroad are aiming to secure "absolute" or "perfect safety," they will be obliged to close all their stations, stop all their trains, and demolish the structure. It would seem to be wiser, though, not to aim at or talk about what is



manifestly impossible, but instead of that, adopt such means as experience has shown will serve to prevent a large class of accidents to which their road especially is exposed.

### THREE CHICAGO RAILROADS.

We have recently published a summary of the reports of the Chicago & Alton Railroad for the year 1878, which is the last of three reports for the calendar year made by Chicago railroads, the three companies occupying the greater part of the quadrant from a line due west to one due south of Chicago, but with the line of the Rock Island Company interpolated. That company reports later and not for the calendar year. The three roads are the Chicago, Burlington & Quincy, the Chicago & Alton, and the Illinois Central. The latter covers the greatest breadth of territory, its northwestern point being Sioux City in Northwest Iowa, 40 miles north of the latitude of Chicago and 500 miles west of it, and its southernmost Cairo, at the southernmost extremity of Illinois, 40 miles south of the latitude of Richmond, Va., 350 miles south of Chicago, and but 80 miles west of it. Between these two lines of the Illinois Central are included the whole of the systems of the three companies (and several others). The Chicago, Burlington & Quincy draws traffic chiefly from a line from Chicago across Illinois and Iowa to Omaha, and south of it as far as Kansas City, on the Missouri, along the Hannibal & St. Joseph in Missouri, and as far east and south as the Illinois River in Illinois—an immense territory, which is exceptionally productive, even in the West, and over which passes the larger part of the traffic of the newer country west of the Missouri, though of course this road does not get it all. The Chicago & Alton is wholly south and east of the Chicago, Burlington & Quincy in Illinois, and south of it and the lines which feed it in Missouri. The Illinois Central crosses both roads, extending, as we have said, much further north and much further south than either. It does not come into competition with the Burlington road to any considerable extent, but does with the Chicago & Alton both for through and local traffic.

These three roads, together with the Chicago, Rock Island & Pacific, are the chief carriers between Chicago and the great corn, hog and cattle-growing districts of the Northwest. In their territory, also, is produced most of the winter wheat that finds its way to Chicago, but, except on the Iowa line of the Illinois Central, it does not produce much spring wheat, and a very large share of what these roads carry comes from beyond their own lines, from Nebraska and Kansas. In the year 1878 the total receipts and the receipts by these three roads at Chicago of these staples were:

	Corn, bush.	Hogs, No.	Cattle, No.
The four roads.....	49,482,961	4,378,205	811,326
Total.....	63,651,518	6,447,166	1,083,008
P. c. by the four roads....	78	68	75
three roads.....	61	52	59

The three roads here considered worked altogether an average of 3,550 miles of road in 1878. The total mileage of roads entering Chicago from the West and carrying to it nearly all the farm produce that it received, was about 8,200 miles. The three roads, therefore, had about 43 per cent., the four roads 55 per cent. of the whole mileage.

The only other important carriers of produce to Chicago are the two to the Northwest, and of these one carries chiefly to Milwaukee, and cannot properly be compared with the Chicago roads on the basis of its deliveries at Chicago.

We do not expect a railroad that has more branches than main line to show so large a traffic and earnings per mile of road as one that is all main line. For instance, the average earnings per mile of the "Main Line and Branches" of the Pennsylvania Railroad were but \$18,000 in 1877, but for the 358 miles of the main line they were \$46,800. The 697 miles of branches averaged but little more than \$3,200 per mile. It is therefore desirable, in comparing roads, to state main line and branches separately. But it is not always easy to say what is main line. Below we have made our division by including with main line the lines over which a considerable through traffic passes—for the Illinois Central, the line from Chicago to Cairo, and that from Dubuque to Sioux City; for the Chicago, Burlington & Quincy, the line from Chicago to Council Bluffs and that from Galesburg to Quincy; for the Chicago & Alton, the Chicago & St. Louis line and also that part of the Jacksonville Division and the Louisiana & Missouri River line over which its Kansas traffic passes, giving the following results:

	Main line.	Branches.	Total.
Illinois Central.....	691	535	1,226
Chicago, Burlington & Quincy.....	586	1,005	1,591
Chicago & Alton.....	470	100	570

Thus 56½ per cent. of the Illinois Central, 35½ of the Burlington, and 70 per cent. of the Chicago & Alton appears to have been "main line" in 1878.

Nearly half of the Illinois Central's main line, however, the 326 miles between Dubuque and Sioux City, is its poorest road, and has an extremely light through (as well as local) traffic, the country beyond it not being developed as yet.

The gross earnings and the average earnings per mile of road of these three systems in 1878 were:

	Gross earnings— Total.	Per mile.	Net earnings— Total.	Per mile.	P. c. of exp's.
Illinois Central.....	\$7,140,208	\$5,685	\$4,052,773	\$3,237	43.24
Chicago, Burlington & Quincy.....	14,119,665	8,526	6,247,750	3,773	55.75
Chicago & Alton.....	4,671,519	6,892	2,156,385	3,181	53.80

The Burlington road's gross earnings per mile are just 50 per cent. greater than the Illinois Central's, and 24 per cent. greater than the Chicago & Alton's; its net earnings per mile, however, are but 17 per cent. greater than the Illinois Central's and 18½ per cent. greater than the Chicago & Alton's.

All these roads have light capital accounts, the stocks and funded debts per mile of road being:

	Stock.	Bonds.	Total.
Illinois Central.....	\$41,106	\$14,748	\$55,854
Chicago, Burlington & Quincy.....	17,408	19,227	36,635
Chicago & Alton.....	25,900	16,489	42,389

The average for the whole United States is about \$61,000.

It will be noticed that the road with the smallest capital account has the largest gross and net earnings per mile. This alone largely accounts for its larger average dividends.

Compare these with three leading St. Louis roads:

	Stock.	Bonds.	Total.	Gross.	Net.
St. Louis, Kansas City & North'n.....	\$63,325	\$27,392	\$90,717	\$6,029	\$2,396
Missouri Pacific.....	2,714	53,722	56,436	9,453	3,940
St. Louis & Iron Mountain.....	31,387	43,183	74,570	6,595	2,843

The Missouri Pacific, it is seen, had greater gross and net earnings per mile than either of the Chicago roads, but more than three-fourths of it is main line. Its stock is also very much smaller than that of any of the other roads, or indeed than almost any other anywhere; having just gone through a foreclosure suit which destroyed most of the old stock. None of the Chicago roads has so large a funded debt or so large a capital as either of the St. Louis roads. On the average the latter have three-fifths more capital than the Chicago roads. The latter are much the most complete roads, however—have more double track and sidings, more steel rail, more ballast, more fences and a much heavier equipment.

Here we have the secret of the financial lack of success of the St. Louis roads. None of them pay dividends; one does not pay a considerable part of the interest on its bonds. It is not so much that there is no traffic or no profits as because the capital is too large for the profits. With no larger capital than the Chicago, Burlington & Quincy, the Iron Mountain's net earnings in 1878 would have been nearly 8 per cent. on its stock and bonds. This should be borne in mind when we call roads "prosperous" or "unprosperous." Certainly it need not be argued that the roads with a small funded debt per mile are much less exposed to financial dangers. While the Chicago & Alton needs less than \$1,200 of net earnings per mile of road to meet its interest charges, and the Illinois Central less than \$900, the Missouri Pacific must have nearly \$3,500 and the Iron Mountain nearly \$3,000. It is therefore not astonishing that when trouble comes the Chicago roads keep on paying dividends, while the St. Louis roads have difficulty in meeting their interest.

In comparing the traffic of the three Chicago railroads, we encounter one serious obstacle. For the past three years the Chicago, Burlington & Quincy has not reported its freight mileage, and for 1878 not even the passenger mileage. This prevents ascertaining exactly the average rate and cost per mile, the average bulk of traffic per mile of road, the average train-load, and other facts most essential in comparing roads with each other or the business of one year with that of another on the same road. The Chicago, Burlington & Quincy has a heavier traffic than any other Chicago road, and its traffic grows faster than that of any other, and it would be exceedingly interesting to know just how large the traffic is, how fast it grows, what rates it gets and in what loads it is carried.

We have made an approximate statement of the passenger and tonnage mileage below. It was reached by assuming the average haul of both passengers and freight to have been the same in 1878 as in the last year in which the mileage was reported—that is, 1877 for passengers and 1875 for freight. These average hauls had not varied greatly for several years previous to the years when last reported, so that we may

\*The Illinois Central has about \$6,300,000 invested in its southern connections, and for about \$5,000,000 of this it has bonds of the line which are likely to be a good asset. Subtracting this \$5,000,000, as representing the capital of another road, the Illinois Central's debt is but \$8,200 per mile and its total capital \$49,300 per mile of road.

assume them to be approximately correct. The average freight haul tends to increase on this road, because the additions to traffic are chiefly contributed by the newly settled districts on its western extremities or on other roads beyond them.

Making this assumption, we reach the following statement of the density of traffic of the three roads, as represented by the number of passengers and of tons of freight which, carried each way daily (365 days in the year) over the whole extent of each road, would make up its aggregate passenger and tonnage mileage:

	Passengers.	Tons freight.
Illinois Central.....	49	342
Chicago, Burlington & Quincy.....	77¼	600¼
Chicago & Alton.....	76¼	501¼

With the smallest capital account and the largest traffic, the Chicago, Burlington & Quincy certainly has an extraordinarily strong position among Western railroads—the strongest of all west of Lake Michigan, doubtless. With the same rates it can earn more, and with the same earnings it can divide more to each dollar of stock and bonds than any of its competitors, except perhaps the Chicago, Rock Island & Pacific, which accounts for the prices which its securities bear in the market.

But in this country of changes, and especially in the Northwestern country of varying growth of settlements and production, it is desirable to know what is the tendency of traffic, as well as its absolute amount at any given time. It is more difficult to trace this than might be supposed. These roads add to their mileage from time to time, and frequently the additions are of road which, however great a profit they may yield, have nothing like the average traffic of the old lines, and so with equal or increasing prosperity bring down materially the average traffic per mile of road. Hardly any more striking instance could be cited than the purchase of the Rockford, Rock Island & St. Louis road by the Chicago, Burlington & Quincy. The Rockford road had a very thin traffic, but was bought at a very low price. If it has earned net per mile a quarter as much as the other roads, it has been as profitable as they. So the Illinois Central and the Chicago & Alton have made smaller additions (the former only after 1877) of shorter lines with less than their average traffic. We will therefore give, together with the traffic per mile of road, the total passenger and tonnage mileage of the three roads for a series of years, the Chicago, Burlington & Quincy's freight being estimated as above since 1875:

COURSE OF TRAFFIC FOR SIX YEARS ON THREE CHICAGO RAILROADS.  
Illinois Central.

Year.	Av. miles worked.	Total traffic mileage— Passenger.	Freight.	Equivalent per day each way. Pass. Tons ft.
1873.....	1,108	48,503,760	275,303,400	60.0 340.5
1874.....	1,108	51,115,300	273,559,200	63.3 338.6
1875.....	1,108	50,828,500	284,650,900	62.9 352.5
1876.....	1,108	51,238,000	294,602,300	63.4 328.8
1877.....	1,108	46,076,800	249,345,900	57.0 308.7
1878.....	1,226	43,849,200	306,345,700	49.0 342.3

This road, it appears, has had a declining aggregate passenger traffic, and, what is more remarkable in a Western railroad, until last year a declining freight traffic also. Going back further, we find that the passenger traffic was smaller in 1878, with an average of 1,226 miles worked, than in any year since 1868, with 1,108 miles most of the time, and 18 per cent. less than in 1869, when but 964 miles were worked.

The freight traffic generally increased slowly from 1868 to 1875, then for two years decreased, but last year took the great step forward shown by the table—the greatest in the history of the road, being 11 per cent. per mile of road. It may be said here that this road and the Chicago & Alton have had to fight for their traffic since the multiplication of roads in Illinois south of the latitude of Chicago, to a much greater extent than any of the Chicago lines that are situated further north. It would have been astonishing if they had been able to keep up an increase of traffic equal to that on those lines, including the Chicago, Burlington & Quincy, to which we will now turn:

Chicago, Burlington & Quincy.

Year.	Av. miles worked.	Total traffic mileage— Passenger.	Freight.	Equivalent per day each way. Pass. Tons ft.
1873.....	1,236	83,275,830	418,385,184	92.2 463.7
1874.....	1,208	85,356,325	445,686,220	92.3 481.5
1875.....	1,272	93,770,794	436,063,161	101.0 470.0
1876.....	1,339	99,238,481	529,355,000	101.5 538.5
1877.....	1,650	93,087,524	591,650,000	79.8 500.3
1878.....	1,650	93,087,524	723,455,000	77.3 600.6

The passenger traffic, it appears, has not grown much, notwithstanding an increase of one-third in the mileage worked. The acquisition of the St. Louis line is marked by the great decrease in the traffic per mile of road from 1876 to 1877—22 per cent. in passengers and 7 per cent. in freight. The enormous increase in freight per mile from 1877 to 1878 was not accompanied by any increase in passenger traffic.

The third of these railroads is really intermediate between the other two, as regards the fields from which they gather their traffic, competing with the Illinois Central for St. Louis and southern traffic, and



it does with the Burlington road for Kansas City and other southwestern traffic.

#### Chicago & Alton.

Year.	Av. miles worked.	Aggregate traffic mileage.	Passenger.	Freight.	Equivalent per day each way.
1873	649	38,423,250	179,430,897	81.1	379.0
1874	649	41,865,525	155,261,512	88.4	327.0
1875	650	39,913,851	168,923,879	84.1	356.0
1876	678	41,231,777	217,835,161	83.3	440.1
1877	678	40,743,272	211,047,505	82.3	428.2
1878	678	37,707,542	248,280,318	70.4	501.6

Here we have had to do for the Chicago & Alton for 1873 and 1874 what we did above for freight on the Chicago, Burlington & Quincy for 1876, 1877 and 1878, and for passengers in 1878, that is, estimate the passenger and tonnage mileage, which we have done by assuming that the average haul was the same in the earlier years as in 1875, which, as the length of road was the same, is probably not very far from the truth. At least, the comparison is exact as far back as 1875.

The passenger traffic has been remarkably steady; the freight traffic, on the contrary, has shown a general tendency to increase, and that there has been so much more increase on this road than on the Illinois Central is doubtless due largely to the fact that it gets a share of the large Kansas City traffic, which has grown faster than any other large traffic in the West.

Taking now the three roads and comparing their traffic (both total and the amount per mile of road), in 1878 with that in 1873, we have the following percentages of increase and decrease:

	Passenger mileage.	Aggregate Per mile.	Tonnage-mileage.	Aggregate Per mile.
Illinois Central	Dec. 9.6	Dec. 18.3	Inc. 11.3	0.5
Chicago, Burlington & Quincy	Inc. 13.0	" 16.2	" 73.0	29.5
Chicago & Alton	Dec. 1.0	" 5.8	" 38.4	32.3

In comparing these results, we should remember that the Chicago, Burlington & Quincy has increased its mileage most, and has doubtless reduced its average considerably by these additions. The Chicago & Alton has been nearly stationary (increase  $5\frac{1}{2}$  per cent. since 1873), and the Illinois Central has added but little (10 per cent., all after 1877). The Chicago & Alton has maintained its passenger traffic best (per mile of road; the monstrous addition of nearly 400 miles to the Burlington's system makes its aggregate traffic valueless for comparing one year with another). The Illinois Central has lost most. All the roads show an increase in freight traffic per mile, but the Illinois Central's is trifling. The Chicago & Alton shows the largest increase in freight (per mile) as well as the smallest decrease in passengers, due largely, doubtless, to the fact that it has added very little new line with thin traffic to its system.

With the above table of traffic changes we will now contrast the changes in rates for the same time, which are given below in cents per passenger and per ton per mile. It must be borne in mind that the Chicago & Alton rates for 1873 and the Burlington rates for 1878 are only approximate, being based on the mileages calculated as described above.

	Passenger mile.	Ton mile.
Illinois Central	1873. 3.54	1878. 2.19
Chicago, Burlington & Quincy	1873. 3.02	1878. 1.92
Chicago & Alton	1873. 3.50	1878. 2.17

Everywhere we find a large reduction. For passengers on the three roads, in their order, it is 11, 13, and 21 per cent.; for freight, 25, 20 and 40 per cent. The Chicago & Alton and the Illinois Central, which have had the smallest increases in freight, have had to suffer the largest decreases in freight rates—40 and 25 per cent. respectively—for causes that we have often explained, namely, the necessity of meeting, at many points on their Illinois lines, the trunk-line rates to the East, which most of the time leave no profit whatever to any road with less than a trunk-line traffic, if even they do to these. Roads extending southward from Chicago have to submit to this necessity; those extending northwestward, westward, or but little south of west, either are not affected by it at all, or only to a very slight extent. The Chicago, Burlington & Quincy, from Chicago to Quincy, may be considered as the northern border of the district to which trunk-line rates are made.

But there will be no end if we make all the comparisons which it would be interesting to institute between these three roads. Before we close, however, we will note the changes in the yearly earnings, expenses and fixed charges per mile of road worked. The fixed charges include rentals and interest.

	Ill. Cen.	C. B. & Q.	C. & A.
Gross earnings	1873. \$7,524	1873. \$5,085	1873. \$8,905
Working exps.	4,153	2,458	5,074
Net earnings	3,371	2,627	3,831
Fixed charges	1,090	1,124	1,080
Surplus over fixed charges	2,281	1,503	2,751
Per cent of expenses	55.19	43.24	56.41

The greatest change here is in working expenses. Every road except the Illinois Central has had an increase in traffic, but their expenses per mile of road

have decreased immensely—on the Illinois Central more than 40 per cent., on the Alton nearly 30 per cent., on the Burlington, more than 6 per cent. Net earnings, it will be seen, have changed but little—some decrease on every road, but not 5 per cent. where it is largest. Two of the roads have lighter fixed charges, and the surplus over fixed charges has not much changed—is 8 per cent. less on the Central, 3 per cent. less on the Alton, and nearly 6 per cent. more on the Burlington—which, by the way, had an extremely favorable year in 1878.

Considering the fact that earnings are in gold now, the surplus net earnings of these roads—the portion that belongs to the stockholder, whether paid to him or invested in additions to his property—was actually greater on all these roads in 1878 than in 1873.

That they have done so well has been largely due to their light debts, in which respect all the roads extending westward from Chicago are peculiarly favored.

#### ST. LOUIS FREIGHT MOVEMENT.

The sources of St. Louis traffic and the growth of its receipts and shipments by different routes are given in tables which show the number of tons received and shipped by each railroad and river, as reported by the Chamber of Commerce of that city, and copied in the late report of the St. Louis, Kansas City & Northern Railway. It appears from these that St. Louis commerce is more like that of an interior city than that of a border city. Most large cities in the West receive farm produce almost exclusively from the country west of them and ship it chiefly to the country east. The St. Louis tonnage reports do not separate one kind of freight from another, but we know very well by what roads manufactured goods reach that city, and we find that it has large receipts from the east which come from roads which do not bring it much except coal and agricultural produce. In fact, a very large proportion of the grain arriving at St. Louis comes from Illinois, and of the total tonnage arriving there more than half comes from the railroads east of the Mississippi, and another considerable portion (nearly 7 per cent. last year) from the rivers that are east of the Mississippi. Nearly two-fifths of its freight last year came from the country east of the Mississippi. This is in striking contrast with Chicago, which probably receives at least two tons from the west to one from the east. It is, however, partly accounted for by the fact that the coal receipts of St. Louis are wholly from the east (Illinois mines near by), while the chief receipts of bituminous coal at Chicago are from the West.

It is further noticeable that the increase of business at St. Louis is contributed almost as much by its eastern as by its western roads. From 1874 to 1878 there was an increase of 792,000 tons, or 20½ per cent. in the aggregate of the freight received there. Of this increase, 383,000 tons came from the routes east of the Mississippi, and 409,000 from those west of the Mississippi. (A decrease of 53,000 tons by the Mississippi accounts for the difference.)

The ratio of increase has been, it is true, much the greatest on the trans-Mississippi lines—42½ per cent. against 16½—but the difference is still not such as most would suppose, judging from the general course of Western traffic. During these years the country west and southwest of St. Louis has grown very rapidly—especially Kansas and Texas—but St. Louis does not get all their produce, by any means, and seems to have a surer hold on that of Southern Illinois, close by it, although the latter district is in the wrong direction from it. Shipping grain and hogs thence to St. Louis is like shipping similar articles from Michigan to Chicago; nevertheless, St. Louis is largely supplied with these staples from Illinois, and Chicago hardly at all from Michigan.

Care should be taken not to confound the tonnage reported above with the business of St. Louis. To the railroads certainly the tonnage is the most important, but mercantile business is not wholly measured by bulk. A business which has grown rapidly in St. Louis of late years is cotton; but this does not make much freight, and a large proportion of the raw material received in St. Louis is manufactured there—a larger proportion, probably, than in any other large Western city except Cincinnati.

The river receipts at St. Louis seem nearly stationary. They were less in 1878 than in 1874, but greater than in any intermediate year.

The receipts by the different roads have varied considerably from year to year. Of those west of the Mississippi only the two leading from Kansas City show a steady increase. The Iron Mountain, it is true, delivered about 75 per cent. more in 1878 than in 1874, but 1874 was the first year it was open through to Texas, and

the receipts by it in 1875 were much larger than in any succeeding year, and 28 per cent. more than in 1878. The St. Louis & San Francisco brought to St. Louis a little more in 1874 than in 1878; the small receipts of the Missouri, Kansas & Texas have increased a little since 1874; but there has been an increase of more than 25 per cent. by the Missouri Pacific and of eighty-two per cent. by the St. Louis, Kansas City & Northern. The latter has an immense district to itself—the whole country north of the Missouri and west of the Mississippi, into which no other St. Louis railroad penetrates. That is, it has it to itself so far as shipments to and from St. Louis are concerned; for it is just here that the Chicago railroads are the most effective competitors for traffic, and they get, we suppose, much the largest part of it north of this road's Kansas City line. Its increase in business has probably come chiefly from Kansas, and very little from Iowa.

In the receipts from the East, the chief progress since 1874 has been made by three roads which are alongside of each other, as it were, namely, the Vandalia Line (46 per cent.); the Indianapolis & St. Louis (70 per cent.) and the Wabash (124 per cent.). The St. Louis Division of the Chicago, Burlington & Quincy brought more than twice as much in 1878 as in either of the three years previous, but only about a third more than in 1874. The Chicago & Alton did about the same in 1878 as in 1874, as did the St. Louis & Southeastern.

The tonnage and proportion of the total traffic from the East by rail contributed by each road in 1878 was:

	Tons.	P. c. of total.
Vandalia line	402,252	16.8
Belleville & Southern Illinois	383,739	16.1
Wabash	264,831	11.1
Ohio & Mississippi	222,052	11.0
Indianapolis & St. Louis	228,568	9.6
Illinois & St. Louis	224,240	9.4
St. Louis & Southeastern	223,248	9.4
Chicago & Alton	191,020	8.0
Chicago, Burlington & Quincy	142,836	6.0
Cairo & St. Louis	63,885	2.6
Total	2,387,571	100.0

It should be noted here that the receipts by the little Illinois & St. Louis road (only 15 miles long) are nearly all coal; probably more than half of the Belleville & Southern Illinois receipts are coal also, and a good deal of coal is brought also by the St. Louis & Southeastern and the Vandalia Line.

As regards shipments, another peculiarity of St. Louis traffic, which is the corollary of that we have mentioned in the receipts, is that the roads east of the Mississippi take away in the aggregate much less than they bring the city—not much more than half as much in the aggregate. How different this from the Chicago receipts and shipments by eastern roads, which carry away probably four tons for every one they bring. Coal has much to do with this, on which the hauls are short; but farm produce has a great deal to do with it too, the five roads which carry nearly all the St. Louis shipments of grain, flour and hogs or hog products to Atlantic ports also carrying large amounts of grain and hogs to St. Louis. Let us compare the receipts and shipments by these five roads in 1878, during most of which by agreement the through shipments (except live stock) were divided equally among them (but not the through receipts):

	Receipts.	Shipments.
Chicago & Alton	191,020	256,444
Wabash	264,831	260,753
Indianapolis & St. Louis	228,568	157,044
Vandalia Line	402,252	190,685
Ohio & Mississippi	222,052	130,677
Total	1,308,923	1,021,203

Thus these roads, the chief outlets of St. Louis to the East, brought it a third more than they carried from it.

The explanation is that the East is not the market of St. Louis grain and meat to anything like the extent that it is the market of the produce collected at Chicago. Such articles it sends in great quantities to the South and Southeast. Aside from the shipments down the Mississippi, which in 1878 were equal to more than two-fifths of its shipments by the above roads, the Iron Mountain, the Southeastern and the Belleville line carry considerable quantities destined to points south of the Ohio, as do also two of the roads named above as eastern outlets, the Vandalia Line and the Ohio & Mississippi, both of which make lines or parts of lines to Louisville.

This is one of the reasons why St. Louis traffic is much less important than Chicago traffic to the trunk lines. Aside from the fact that there is much less of it, not nearly so large a part of it goes to the East. The agricultural produce which it collects is distributed chiefly for domestic consumption over a very wide territory in this country, in all directions except west and northwest; but a large part of the enormous receipts of Chicago crosses the Atlantic, and comparatively little goes south.

Of roads west of the Mississippi the largest increase of shipments from St. Louis since 1874 has been on the



St. Louis, Kansas City & Northern (nearly 80 per cent.), against less than 15 per cent. on the Missouri Pacific. The Iron Mountain has been nearly stationary since 1875, but it carries more out of St. Louis than any other trans-Mississippi road (much of it, perhaps most, going east of the Mississippi, however). The long St. Louis & San Francisco carried but 7 per cent. of the total. Of roads east of the Mississippi the Chicago & Alton has made an enormous gain (161 per cent.), the Wabash a still greater one (330 per cent.), and the Vandalia Line a respectable gain (36 per cent.); the other two through routes to the East show losses, the Indianapolis & St. Louis 10 per cent. and the Ohio & Mississippi 6 per cent. On these five carriers to the East, the quantities and percentages carried in 1874 and 1878 have been:

	1874.		1878.	
	Tons.	P. c.	Tons.	P. c.
Wabash.....	62,618	10.1	279,753	27.4
Chicago & Alton.....	97,885	15.7	256,444	25.1
Vandalia Line.....	139,831	22.5	190,685	18.7
Indianapolis & St. Louis.....	175,389	28.2	157,644	15.4
Ohio & Mississippi.....	145,914	23.5	136,677	13.4
	621,637	100.0	1,021,263	100.0

Thus the relative rank of these lines as carriers from St. Louis has been almost completely reversed since 1874, the two northerly routes in 1878 carrying more than half of the whole, while they had but about a quarter of it in 1874.

The river shipments have been nearly stationary since 1875, but last year were a seventh less than in 1874. The greatest public interest is in the shipments down the Mississippi, which are only about 70 per cent. of the total river shipments. These and their percentage of the total St. Louis shipments have been, in each of the years:

	Tons.	P. c. of Total.
1874.....	474,510	24.5
1875.....	368,715	19.0
1876.....	379,070	16.8
1877.....	436,725	19.0
1878.....	434,460	17.4

The changes are too small to be of much significance, except to show that the improvement of the mouth of the Mississippi has not yet made any great diversion in the shipments of St. Louis.

#### Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:

*Marietta & North Georgia*.—Extended northward to Canton, Ga., 7 miles. It is of 3 ft. gauge.

*Utah & Northern*.—Extended from Blackfoot, Idaho, northward 13 miles. It is of 3 ft. gauge.

*Burlington & Missouri River in Nebraska*.—This company's *Republican Valley* line has been extended from Red Cloud, Neb., westward to Riverton, 15 miles.

*Cumberland & Ohio, Southern Division*.—Extended from Rolling Fork Bridge, Ky., south 5 miles.

*Atchison, Topeka & Santa Fe*.—On the *Leadville Extension* the first track has been laid from Cañon City, Col., westward 7 miles.

*Southern Pacific*.—Extended eastward to Gila Bend, Arizona, 10 miles.

This is a total of 57 miles of new railroad, making 298 miles reported thus far this year, against 236 miles for the same period in 1878, and 165 in 1877.

THE LOUISVILLE & NASHVILLE COMPANY, according to a circumstantial statement in a Louisville newspaper, has made such acquisitions of St. Louis & Southeastern securities as will enable it to obtain possession or control of that road. This is a notable movement, for it virtually moves the northwestern terminus of the Louisville & Nashville from Louisville 250 miles west to St. Louis; or, rather, it gives it a new northwestern terminus at St. Louis in addition to its old northeastern one at Louisville; for the junction of the two roads is as far south as Nashville. The Southeastern has not been a profitable property. In working for a share of the traffic between St. Louis and the Southeast, it has had the disadvantage of being compelled to depend upon rival roads for a connection south of Nashville. The Nashville & Chattanooga had its own road to the Mississippi, and, of course, favored shipments that passed over the whole instead of half of its line; and the Louisville & Nashville had a similar objection to turning traffic over to a rival when it could carry it further on its way itself. Evidently the Louisville & Nashville can provide for its through traffic better than it could do for itself, though the Louisville & Nashville will not have matters all its own way, by any means; for it needs to keep on good terms with the Nashville & Chattanooga, which gives it its best outlet to Atlanta and other important places, and will not like to have its St. Louis business by way of Columbus interfered with too much.

The St. Louis & Southeastern has 344 miles of road, 135 of which are south of the Ohio River. The Louisville & Nashville has 976 miles, so the two together will make 1,320 miles—a considerable system, certainly, and larger than any other in the South. The Southeastern has a funded debt of \$9,500,000, besides a large amount of unpaid coupons. It would have required but a fraction of this sum to purchase a majority of the bonds, however. The interest accruing yearly is \$665,000 and the largest net earnings hitherto have been

less than \$300,000. But if the road cannot earn interest on the \$27,000 a mile of its present debt, it may on a debt of \$10,000 a mile.

THE REGULATION OF THE CROSSING OF ONE RAILROAD BY ANOTHER is a delicate matter, variously determined in different states. A crossing at one point or in a given way may very greatly injure the efficiency of one of the roads, and it is always desirable that the question of the place and manner of the crossing should be submitted to a competent tribunal when the two companies cannot agree. In Ohio recently the company laying out the new road was the sole judge of the necessity. The authorities had no further discretion than to award compensation for property taken.

A few years ago the law was changed, and some time in 1877 there was a decision in the Probate Court of Trumbull County which held that this court, which is the tribunal which the law establishes to hear such cases, has the power to decide as to the necessity of the crossing at a given place, as well as the question of damages. In this case the Lake Erie, Alliance & Wheeling Company asked for the right of way across the Atlantic & Great Western at a point where there was a grade of 48 ft. per mile and a curve, making it the hardest part of that division to haul a train over. The Atlantic & Great Western claimed that a crossing at that point would make it necessary to reduce the maximum load west-bound on that division by one-sixteenth. It showed that it had agreed to a crossing at other points where the grades were easier, and that such crossings would give a better line for the other road, but would make it necessary for it to acquire a more expensive right of way. The Lake Erie, Alliance & Wheeling claimed that this was a question for it alone to decide. The court found otherwise, and decided that the necessity of the crossing had not been proved, and refused to appropriate the right of way.

THE PENNSYLVANIA RAILROAD SYSTEM OF ADMINISTRATION has received the high compliment of being recommended to the government of Prussia as a model on which to base changes in the administration of its state railroads, by a railroad officer whom it sent to this country to study our roads. Mr. H. Bartels, who was here in 1876, wrote a monograph description of the Pennsylvania's organization, which has been published, and, very recently, he has published an important work on the working arrangements of American railroads, especially stations and signals, in which he speaks very favorably of some of our arrangements, and recommends their trial in Germany. This work seems to have made a strong impression in German railroad circles, and has been discussed with interest in railroad societies and journals; and the desire is generally expressed to have some experiments made with American methods on German roads. It is noticeable that Europeans who have never been in America very generally have a great contempt for our railroads; but most of those who have examined them on the spot, especially railroad experts, have confessed to a good deal of admiration for the manner in which we have adapted our means to our ends, and not a few Europeans have declared that they can learn something from us that will be good for them at home.

THE INTERNATIONAL ROAD-MASTERS' ASSOCIATION is the latest addition to our societies of railroad officers. We give elsewhere a report of the recent meeting at Boston, which was, naturally, chiefly devoted to forming an organization. That there is abundant material to occupy such a society profitably is shown pretty clearly by the extremely interesting reports of Mr. Latimer's meetings of the road-masters of the Atlantic & Great Western Railroad. The greatest difficulty in the way of a national, not to say international, association, is the vast extent of the country, which is the greater obstacle the more numerous the class that are invited to membership. Roads that would not hesitate to send one master mechanic half-way across the continent to attend a convention may hesitate a little before granting leave of absence to half-a-dozen on a dozen road-masters. Yet there is no doubt that it would often be a good thing if they would send them away from home and let them see how work is done on foreign roads with their own eyes. We suggest that a convention be held some time on the Pennsylvania Railroad at the time of its annual track inspection (if the Pennsylvania Railroad is willing). It would be a liberal education to some road-masters. As Mr. Huntington has well said, the man who is tied to his own section is apt to get into a rut, and take little heed of improvements that other people have made.

THE PROPORTIONS OF IMPORTS AND EXPORTS at the different ports in the month of February we have calculated from the reports of the Bureau of Statistics, from which it appears that the percentage of the total imports and of the domestic exports of each of the leading ports was:

	Imports.	Exports.
New York.....	75.4	41.4
Boston.....	6.6	5.1
San Francisco.....	4.8	3.0
Baltimore.....	3.7	6.9
Philadelphia.....	3.3	5.0
New Orleans.....	2.2	17.6
Galveston.....	0.2	3.6
Charleston.....	0.2	3.6
Savannah.....	0.2	3.3
Mobile.....	0.1	2.1
Norfolk.....	0.1	1.7
The eleven ports.....	96.5	93.3

The value of the exports was four-fifths more than that of the imports. The value of the New Orleans exports was seventeen times that of its imports, but at New York the value of the imports was just about equal to that of the exports.

WHEAT AND CORN EXPORTS from the four leading Atlantic ports from July 27 to Feb. 21, seven months, are reported by the *Produce Exchange Weekly* to have been 93,699,147 bushels, of which 49,914,863 bushels, or 53.3 per cent., were from New York, 18,860,357 bushels, or 20.1 per cent., from Baltimore, 18,803,537 bushels, or 20.0 per cent., from Philadelphia, and 6,120,390 bushels, or 6.6 per cent., from Boston. The wheat exports were just about twice as great as the corn exports. A little more wheat went to France than to Great Britain, but 98 per cent. of the corn went to Great Britain. New York exported 57 per cent. of the wheat but only 46 per cent. of the corn; Baltimore, 18 per cent. of the wheat and 20½ per cent. of the corn; Philadelphia, 20 per cent. of the wheat and 20 per cent. also of the corn.

Baltimore and Philadelphia have sometimes exported more of the corn, but never so much of the wheat.

THE ADVANCE IN EAST-BOUND RATES, which was to take effect March 24, seems to have left enormous grain contracts unaffected by it, if we may judge by the grain shipments of Chicago for the week following this advance, which were probably the largest ever made by rail from that city in a single week, amounting to 2,063,999 bushels, which is nearly twice its shipments in any previous week this year, and for the first time largely exceeds its receipts for the week—1,587,071 bushels. This is the first indication that the great stocks on hand at the lake ports may be reduced before navigation opens.

#### Contributions.

##### The Law of Friction and the Westinghouse-Galton Experiments.

BALTIMORE, Feb. 27, 1879.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Your startling statement in your paper of the 21st inst., that Mr. Westinghouse and Captain Galton have proved conclusively what has for years been suspected and indicated by others—that the supposed law that friction during motion is independent of the velocity of motion is not true, will doubtless afford great relief among those who have been making experiments to solve that great problem.

I will quote a sample authority, on which the contrary general belief has heretofore been based.

W. H. C. Bartlett, LL. D., Professor of Natural and Experimental Philosophy in the United States Military Academy at West Point, says on page 316 of his "Elements of Natural Philosophy": "The friction, which accompanies motion, is always independent of the velocity with which the bodies move." This opinion is contrary to the conclusions of Mr. Westinghouse and Captain Galton. "When doctors disagree, who shall decide." After a careful reading of the matter of your editorial, I must say that I still concur with the statement made by Professor Bartlett and M. Morin, of the French Academy of Science. I believe that friction *per se* is independent of the velocity of the things in contact, whether it may ensue from a brake-shoe rubbing against a revolving car-wheel, a revolving locomotive driving-wheel on a rail, or a sled running on ice or any other smooth surface.

These conclusions are based, in a degree, upon the confidence I have for the great and careful experimentalist, M. Morin, Professor Bartlett, of West Point, the general belief of the practical master mechanics of the world, and my own experiments and observations.

I unhesitatingly give it as my opinion that Mr. Westinghouse and Captain Galton are entirely mistaken when they assert that friction varies with different velocities, as set forth in your editorial. Upon this opinion I am willing to be adjudged competent or incompetent, either to write a reliable paragraph for a newspaper, or to construct a practical air-brake.

WM. LOUGHRIDGE.

##### Proposed Method of Corporation Taxation in New York.

A committee of the New York Assembly has reported a new system of taxation, in which the following applies to corporation taxation. It has not yet been discussed enough to indicate whether the recommendations are likely to be adopted:

And your committee, in relation to the corporations and other organizations mentioned in the first section of their bill, have considered the great utility of such organizations and the important part they have borne in developing the resources of the state, and the valuable facilities they afford in commercial affairs. They have also considered that they have ever been most favored in legislation, and have been granted by the people great and valuable franchises, privileges, and immunities—many of them exclusive privileges; that many of them have grown great and have accumulated vast aggregations of capital earned by virtue of the franchises so granted, and have further considered that enjoying such franchises as the gifts of the people they have substantially been exonerated from the burdens of taxation, while other property of the state has been borne down and burdened so that in many cases it has amounted to a confiscation of the property, and that all such organizations ought, of right and willingly, to bear a just proportion of such burdens.

Your committee, therefore, to the end that all such organizations may be properly and equitably assessed by an authority having experience in such cases, and competent to do justice to the people of this state and to such parties, and to avoid oppression or inefficient assessment or taxation, have provided that all such organizations shall make report to the State Assessors of all the facts necessary to enable that board to form a correct judgment as to the amount which such organization ought fairly and equitably to be assessed upon their real and personal property and franchises; and have made it the duty of such Assessors, from such report, or from a further examination upon oath, of the officers thereof, or upon view and the best information they



can obtain, to fix and determine the amount of gross assessments for purposes of general taxation of each of such organizations.

And in the cases of all such organizations doing business entirely within any one county of this state, it is made the duty of the State Assessors to transmit certificates of such assessments to the clerks of such county, to be entered by the board of supervisors upon the assessment rolls of the proper towns, before laying any tax thereon.

In the case of insurance companies, railroads, canals, news and telegraph companies, and all transportation and forwarding companies doing business in more than one county in this state, or whose line of operation so extends, your committee have carefully examined the former requirement of the statute that they be assessed and taxable in the county where their general or main office is situated, and are unable to find any reasonable or equitable grounds for the rule. They do, however, find that it enables every such organization to change its taxable location to those places where taxes are lightest, and to avoid taxation sometimes by claiming at every taxable point that its general office is at some other point, and that it enables them to make terms by actually fixing its office and taxable location at the place where it can make the best bargain, or like one notable case of an organization with \$5,000,000 of actual capital, which, after locating its office in obscure places in various Western towns, has finally sought refuge from taxation by locating its principal office among the wilds of the Catskills, its exact locality not being yet discovered.

Your committee, having in view these facts, have believed that the most equitable theory is to render them taxable both as to their real and personal property and franchises in those counties of this state into or through which their lines of business run, those being the counties in which their business is actually done and transacted. They have, therefore, provided in their bill that the State Assessors in such cases also apportion the gross assessment of each such organization upon that basis, and further provided that the several boards of supervisors cause the assessment on account of the real estate of every such organization to be further apportioned to the several towns of their counties in which it is situated, and the remainder to the several towns of such county *pro rata*, and in proportion to the amount of the assessments of personal property appearing upon the assessment rolls of such towns, with the hope of bringing out a fuller and juster taxation of personal property.

Exception, however, is made in cases of towns bonded in aid of the construction of railroads, and in those cases the bill provides that all assessments upon such railroads and upon all telegraph lines and lines of transportation and forwarding companies operating over or using the railroad line, shall be apportioned to such towns until the debts so created are paid.

The bonded towns having become indebted by the creation of the very property by the provisions of this act apportioned to them, no one will question the equitable principle which gives the benefit of the taxes assessed thereon to such towns until their bonded debt is paid.

Your committee, aware of the enormous value of the franchises granted to street railroads and elevated railroads, and the great productiveness of that class of property, and considering further that highways, streets, and avenues, ready graded for their use, have been provided at the expense of the people, and costing such corporations nothing, and that so far they have been exempt from the payment of any damages on account of loss or damage to other parties, in consequence of such occupation, and that the use of such streets is a monopoly of them and exclusive so far as their necessities or convenience is affected, and acting upon the equitable principle that those who have a possession and use of property such that it is tantamount to ownership ought properly to be taxed therefor, and finding that the courts have decided that such corporations are properly taxable for such streets and highways as a road-bed, have inserted a provision in their bill requiring that all street and elevated railways be assessed for the streets upon which they run as real estate.

#### Weighing Cars of Lumber.

Since the first of the present month the various railroad companies carrying lumber out of Chicago have been putting in practical operation a scheme which effectually cuts off what has hitherto proved an important advantage to local shippers. It has been the custom hitherto to load from 26,000 to 30,000 lbs. in about every car that left the city, and to pay freight on only 24,000, to the manifest profit of the shipper, and to the equally manifest loss of the carrier. This had grown up into such an evil that the railroads could stand it no longer, and they accordingly adopted the plan of weighing each car and charging at so much a pound any excess there may be over 24,000 lbs. This weighing is done by a man employed by all the railroads together, and who is hence removed as far as possible from any temptation to unfairness on either side. The cars are taken as they come from the Twenty-second street district and separately subjected to the balancing process; if any overweight is discovered, an account is made of it, and the extra charge is duly collected when the car reaches its destination. In this way the railroad companies get paid for the work they actually do, no more and no less; but shippers on the other hand, lose a privilege which they enjoyed so long that it doubtless seemed to belong to them by right, and as it was the source of no little profit, they very naturally hate to give it up.

As a matter of strict equity there is no more ground for asking a railroad to transport 28,000 to 30,000 lbs. of freight and charge only for 24,000, than there is for demanding that lumbermen shall give 1,200 ft. of boards for a thousand.

The natural competitors of Chicago, on the Mississippi, who have long been grumbling at this very abuse of overloading (not so much on account of the railroads, as because they have been unable to obtain similar privileges), will rejoice at this change exceedingly. It places them in one respect, at least, on a nearly equal footing with the lumbermen in this market, and will render the task of selling against Chicago competition, which along back has been a very difficult one, much easier. In the end we believe it will prove a benefit to both sections in that it will bring them nearer together in point of freight advantages. We cannot see why Chicago should be favored to the detriment of the Mississippi, or vice versa. A Chicago dealer has no real right to a privilege that will enable him to ship lumber by Quincy or Hannibal to the exclusion of the operators there, than a Quincy or Hannibal man has to an advantage that will permit him to lay down lumber in some Chicago suburb at less than city prices. A market sometimes gets such favors dealt out to it as Chicago did when it secured the privilege of putting into a car all the lumber it would hold and calling it 24,000 lbs.; but they are to be regarded as among the not always equitably distributed smiles of the fickle dame, and not in any sense as a thing which can be justly claimed.

On the whole, we think in establishing the weighing system the railroads have done a very good thing; the only question now is whether they will stick to it. If our memory is not very much at fault something similar to this has been

tried before, but has always yielded to the local pressure brought to bear upon it. By placing the business of weighing in the hands of a man who is no more the servant of one road than another, however, the companies have removed one serious obstacle to the success of the plan—lack of confidence in each other—and it is therefore quite within the bounds of possibility that they will be able to do what they have attempted.—*Northwestern Lumberman*, March 29.

### General Railroad News.

#### MEETINGS AND ANNOUNCEMENTS.

##### Meetings.

Meetings will be held as follows:

*Lake Shore & Michigan Southern*, annual meeting, at the office in Cleveland, O., May 7. Transfer books close April 5.

*Allegheny Valley*, annual meeting, at the office in Pittsburgh, April 8, at 11 a. m.

*Long Island*, annual meeting, at the office in Long Island City, N. Y., April 8, at 9 a. m.

##### Railroad Conventions.

The *General Time Convention* will meet at the Galt House, Louisville, April 9.

The *Southern Time Convention* will meet at the Continental Hotel, Philadelphia, April 16.

The *Car Accountants' Association* will hold its annual convention at the Grand Pacific Hotel, Chicago, April 23.

*Master Mechanics' Association*, annual convention, at the Grand Hotel in Cincinnati, May 13.

##### Dividends.

Dividends have been declared as follows:

*Housatonic*, 2 per cent., quarterly, on the preferred stock, payable April 15.

*Pittsburgh, Ft. Wayne & Chicago*, 1½ per cent., quarterly, on the special stock, payable April 1; also 1½ per cent., quarterly, on the regular stock, payable April 8.

*Vermont & Massachusetts* (leased to Fitchburg Company), 3 per cent., semi-annual, payable April 7.

*Berkshire* (leased to Housatonic), 1½ per cent., quarterly, payable April 1.

*St. Louis & Pacific*, 3½ per cent., semi-annual, on the preferred stock, payable April 1.

*New York Elevated*, 5 per cent., payable May 1. This is the company's first dividend.

##### Mail Service Extensions.

Mail service has been ordered over railroad lines as follows:

*Alabama Central*, route from Selma, Ala., to Meridian, Miss., readjusted so as to run over the new line from York, Ala., to Lauderdale, Miss.

##### Foreclosure Sales.

The *New Jersey Southern* road was sold at Long Branch, N. J., March 31, under an order of the Court of Chancery of New Jersey, and bought for \$750,000 by Henry Day, Wm. Walter Phelps, Samuel W. Bates and John W. Sterling, trustees for the bondholders assenting to the agreement of Sept. 30, 1875. The sale included the line from Sandy Hook, N. J., to Atsion, with the branches from Eatontown to Port Monmouth, Manchester to Waretown, Whiting to Pemberton and Atsion to Atco, 128 miles of road in all. The sale was made subject to prior liens of \$200,000 on the line from Sandy Hook to Long Branch; \$120,000 on that from Manchester to Tom's River; \$15,000 on real estate at Long Branch, and \$515,000 on the line from Whiting to Pemberton. The station and dock at Sandy Hook were sold separately, and bought in for \$600 by J. G. Moore & Co., holders by assignment of a builders' lien on the property. By the latest statement there were \$2,000,000 bonds issued under the first mortgage, now foreclosed, also \$1,000,000 second and \$1,700,000 third or consolidated bonds.

The *Pemberton & New York* road was sold at Long Branch, N. J., March 31, and bought in by Edward T. Green for account of the Pennsylvania Railroad Company. It was sold under a foreclosure decree sued out by the Pennsylvania on \$140,000 coupons paid by it as guarantor of \$375,000 first-mortgage bonds issued on the road. It is 18½ miles long, from Whiting, N. J., to Pemberton, and was also included in the New Jersey Southern sale above, subject to the lien of these bonds.

The *Bucksport & Bangor* road was sold in Bangor, Me., March 26, and bought in by the bondholders for \$16,000. The road is 18½ miles long, from Bangor, Me., to Bucksport; the bonded debt was \$400,000. It has been worked by the European & North American since its completion in 1874, at a rental of 35 per cent. of the gross earnings.

The *Pittsburgh Southern* road will be sold at sheriff's sale in Pittsburgh, April 11, to satisfy a judgment for \$65,000 for money advanced by James H. Hopkins. The road is of 3 feet gauge, and is completed from Banksville, Pa., to Washington, 22 miles. It has no funded debt, but a floating debt of about \$165,000.

##### Master-Mechanics' Convention.

Mr. J. H. Setchel, the Secretary, issues a circular announcing that the twelfth annual meeting of the American Railway Master-Mechanics' Association will be held on the 13th, 14th and 15th of May, 1879, at the Grand Hotel, in the city of Cincinnati. This magnificent hotel has been selected as headquarters, where the members and their families will be entertained at \$2.50 per day. Those intending to be present will confer a favor upon the committee by sending their names to the Chairman as early as possible, that rooms may be reserved for them. The committee consists of J. H. Setchel, James Eckford, S. S. Pilon. Those wishing rooms will address J. H. Setchel, Cincinnati, O.

##### Boston & Albany Railroad Mutual Relief Association.

At the annual meeting in Springfield, Mass., last week, it was reported that 19 members had been added during the past year, 9 had died and 59 withdrawn, leaving 663 on the rolls. Payments for deaths for the year amounted to \$8,950. The relief fund now amounts to \$763, and the guarantee fund to \$855.

#### ELECTIONS AND APPOINTMENTS.

*Boston & Albany Railroad Mutual Relief Association*.—At the annual meeting in Springfield, Mass., March 27, the following officers were re-elected: Trustees, C. O. Russell, W. H. Stearns, Robert Eccles, H. C. Hamilton, John W. Clark, Marcus Cadwell, A. S. Bryant; Secretary, Albert Holt.

*Canada Southern*.—Mr. Wm. P. Taylor has been appointed General Manager of this road, an office which has been vacant for some time. He has been for several years Superintendent of the Buffalo Division of the Lake Shore & Michigan Southern road.

*Central & Montgomery*.—At the annual meeting, March 13, the following directors were chosen: W. C. Hooker,

Montgomery, Tex.; J. Baker, Plantersville, Tex.; F. A. Hyatt, John H. Owen, Navasota, Tex.; J. Baldwin, B. A. Botts, W. D. Cleveland, F. A. Rice, J. S. Rice, Houston, Tex. The board elected F. A. Rice President; J. Baker, Vice-President; J. S. Rice, Secretary and Treasurer.

*Central Pacific*.—Mr. Jerry H. Whited, for eight years past Train Dispatcher and Division Operator at Carlin, Nev., has been transferred to Wadsworth, Nev., and appointed Train Dispatcher and Division Operator for the Truckee Division.

*Chicago, Burlington & Quincy*.—At the annual meeting in Chicago, March 26, the following directors were chosen: Edward Bangs, James M. Walker, Chicago; Charles E. Perkins, Burlington, Ia.; Peter Geddes, J. L. Gardner, Jr., New York; John N. A. Griswold, Newport, R. I.; Sidney Bartlett, T. J. Coolidge, John M. Forbes, Charles J. Paine, Henry S. Russell, Boston. The only new director is Mr. Bangs, who succeeds Mr. Robert Harris.

*Cincinnati & Muskingum Valley*.—At the annual meeting in Zanesville, O., March 25, the following directors were chosen: James Buckingham, M. Churchill, Zanesville, O.; George W. Adams, Dresden, O.; D. S. Gray, Columbus, O.; Thomas D. Messler, Pittsburgh; George B. Roberts, Philadelphia; Charles Moran, New York. The board subsequently re-elected Thomas C. Messler President; C. C. Waite, Secretary and Treasurer. The road is leased to the Pittsburgh, Cincinnati & St. Louis.

*Fall River*.—Mr. H. A. Blood, of Fitchburg, Mass., has been chosen President. He was formerly Manager of the Boston, Clinton, Fitchburg & New Bedford road.

*Foxburg, Kane & Bradford*.—The first board of directors of this new company is as follows: James Blakeslee, President; F. H. Ball, E. M. Grant, J. M. Guiffey, H. M. McCray, A. W. Smiley. Office at Foxburg, Pa.

*Grayville & Mattoon*.—Besides the board of directors, whose election was noted last week, a second board was chosen by the opposition party at a separate meeting. This board is as follows: R. Bloomfield, W. L. Brown, C. N. Fay, John N. Jewett, R. L. Lowe, A. B. Meeker, Wm. Newell, E. B. Phillips, Frederick Ullman. This board elected A. B. Meeker President; John N. Jewett, Vice-President; John Wolf, Secretary.

*Indianapolis, Peru & Chicago*.—The following circular is dated April 1:

"Mr. F. P. Wade, having this day resigned the office of General Passenger Agent of this company, the office has been placed in charge of Chas. H. Rockwell, Auditor and General Ticket Agent. All communications relative to the passenger business should hereafter be addressed to him. Please place his name on list of regular issue of time card, rate sheets, etc."

*Kent Northern*.—Mr. Henry O'Leary, of Richibucto, N. B., has been elected President, in place of Alexander Given, resigned.

*Lake Shore & Michigan Southern*.—The Buffalo and Erie divisions have been consolidated, Mr. C. B. Couch, Superintendent of the Erie Division, taking charge of the whole line from Buffalo to Cleveland.

*Maine Central*.—At the annual meeting in Augusta, Me., March 26, the old board was re-elected, as follows: Abner Coburn, Skowhegan, Me.; Darius Alden, Augusta, Me.; Arthur Sewall, Bath, Me.; John B. Brown, Wm. G. Davis, George E. B. Jackson, Portland, Me.; Willard P. Phillips, Salem, Mass.; Wm. B. Bacon, George B. King, Alfred P. Rockwell, Boston; George S. Morison, New York.

*Metropolitan Elevated Railway Mutual Aid Association*.—The officers chosen at the first annual meeting are: George D. Davis, Jr., President; M. J. Reed, Charles O. Richards, Vice-Presidents; Edmund F. Bard, Secretary; Allan S. Gookin, Treasurer; David W. Marshall, Eugene Wise, George W. M. Leonard, John Hathaway, Wm. N. Esler, Executive Committee.

*New Jersey Commissioner of Railroad Taxation*.—The Governor of New Jersey has re-appointed Major James S. Yard, of Freehold, State Commissioner of Railroad Taxation for a second term.

*New York & Sea Beach*.—Mr. R. E. Ricker has been elected President. Mr. Ricker is well known as long the Superintendent and Engineer of the Central Railroad of New Jersey, and lately General Manager of the New York Elevated road.

*Northern Pacific*.—Mr. Thomas Doane has been appointed Consulting Engineer, and will soon go to Bismarck to take charge of surveys. Mr. Doane is noted for his judgment in location, and has filled important positions. From 1864 to 1867 he was Chief Engineer of the Hoosac Tunnel; from 1869 to 1874 he was Chief Engineer of the Burlington & Missouri River in Nebraska, and built that road, which has been a very economical line to work, the high grades being confined to a few points where auxiliary power can be used. Since 1874 he has been Consulting Engineer of the Troy & Greenfield road and Hoosac Tunnel, and also Consulting Engineer to the Boston Park Commission. He is President of the Boston Society of Civil Engineers.

Mr. Doane will assume at once the personal oversight of the engineering affairs of the company. After inspecting the work now in progress between the Missouri and the Yellowstone in Dakota, he will proceed to place locating parties in the field in Washington Territory, with a view to the early construction of a division of the road west of the Rocky Mountains, for which the rails are now being shipped around Cape Horn.

*Pennsylvania*.—The appointment of Mr. Charles A. Pugh as General Superintendent Pennsylvania Railroad Division, in place of Mr. G. Clinton Gardner, appointed Manager of the Troy & Greenfield road, is confirmed, to date from April 1. Mr. McClelland succeeds Mr. Pugh as General Agent at Philadelphia.

*Pittsburgh Southern*.—Col. Wm. Espy has been chosen President, in place of Dr. George P. Hays, resigned.

*Pittsburgh, Wheeling & Kentucky*.—At the annual meeting in Wheeling, March 27, the following directors were chosen: C. D. Hubbard, John McLure, M. Reilly, Wheeling, W. Va.; H. G. Lazear, Wellsburg, W. Va.; Thomas D. Messler, Wm. Thaw, Pittsburgh. The board elected C. D. Hubbard, President; W. H. Barnes, Treasurer; J. M. Belleville (of Wheeling), Secretary; Frank K. Semple (of Pittsburgh), Assistant Secretary. The road is leased to the Pittsburgh, Cincinnati & St. Louis.

*Rome, Watertown & Ogdensburg*.—Mr. H. H. Houston has been appointed General Roadmaster, and will also have immediate charge of road and track of the main line from Rome to Ogdensburg. Mr. J. B. Franklin has been appointed Roadmaster of the Syracuse and Oswego & Rome divisions. Mr. Houston has been Roadmaster of the Lake Ontario Division.

*Springfield & Northwestern*.—Mr. George Williams has



been appointed General Freight and Passenger Agent, to succeed Mr. J. G. Rupert, who is now with the Indianapolis, Bloomington & Western, Western Extension. Mr. Williams' office is in Springfield, Ill.

**Terre Haute & Indianapolis.**—Mr. George E. Farrington has been elected Secretary of this company, and Mr. W. S. Roney appointed Acting Auditor, in place of Mr. W. H. Buckingham, deceased. Offices at Terre Haute, Ind.

#### PERSONAL.

—Rev. Dr. George P. Hays has resigned his position as President of the Pittsburgh Southern Railroad Company.

—Col. R. E. Ricker has resigned his position as General Manager of the New York Elevated Railroad. It is said that he has been offered the management of one of the Coney Island lines.

—Mr. John B. Morse, Master Mechanic of the Hannibal & St. Joseph road at Brookville, Mo., died March 25, of nervous prostration, caused by intense pain from a sprained ankle.

—Mr. Alexander J. Derbyshire, for many years a prominent Philadelphia merchant, died in that city March 29, aged 71 years. He served for many years and until 1878 as a director of the Pennsylvania Railroad Company; he was also a director of the Mine Hill & Schuylkill Haven and President of the Little Schuylkill Company, and a director in several of the Pennsylvania's leased lines. He was an influential member of the Society of Friends and a manager of several charitable institutions. He leaves a considerable property.

—Mr. W. H. Buckingham, whose death was briefly noted last week, was born in New Milford, Conn., in 1827, and in 1848 went to Terre Haute, Ind. There he started a bookstore and built up a flourishing business, his knowledge of books, sound literary taste and obliging disposition making his store a social as well as business centre for the reading people of Terre Haute. In 1870 he gave up his business and went to St. Louis as agent for the Vandalia Line; in January, 1872, he was made Secretary of the company and returned to Terre Haute. In 1874 he was made Auditor also, and held both positions up to the time of his death. He was highly esteemed as an upright and honorable man, and to his friends a genial companion.

—Gen. Francis A. Walker, lately appointed Railroad Commissioner of Connecticut, has been nominated by the President and confirmed by the Senate as Superintendent of the Census of 1880. Gen. Walker had charge of the last census, and displayed marked ability in that position, and his new appointment is generally approved.

—Mr. Alfred W. Craven, the well-known engineer, died in London, March 27, in the 68th year of his age. Born in South Carolina, he passed most of his life in New York, and had a large experience as consulting and chief engineer. His chief work was in connection with the Croton Aqueduct, the water supply of New York, with which he was connected as chief engineer for 19 years, from 1849 to 1868.

#### TRAFFIC AND EARNINGS.

##### Railroad Earnings.

Earnings for various periods have been reported as follows:

Year ending Dec. 31:	1878.	1877.	Inc. or Dec.	P. c.
Bangor & Piscataquis	\$75,703	\$57,334	I.	32.1
Net earnings	31,399	24,835	I.	26.5
Cleveland & Pittsburgh	2,474,034	2,392,326	I.	3.4
Net earnings	1,168,580	1,100,664	I.	6.4
Kan. City, St. Joe & Council Bluffs	1,533,651	1,423,707	I.	7.7
Net earnings	448,050	444,607	I.	0.8
Pitts., Wheeling & Kentucky	40,315	.....	.....	.....
Net earnings	10,304	.....	.....	.....

Two months ending Feb. 28:

1878.	1877.	Inc. or Dec.	P. c.
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Philadelphia & Reading	\$1,835,080	\$1,100,390	I.	\$635,690	53.0
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St. Paul & Sioux City	84,089	81,803	I.	2,881	3.5
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Sioux City & St. Paul	42,672	54,084	D.	11,412	21.1
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Month of February:

Philadelphia & Reading	\$877,865	\$525,410	I.	352,455	67.1
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St. Paul & Sioux City	37,965	41,341	D.	3,376	8.2
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Sioux City & St. Paul	20,724	28,176	D.	7,452	26.4
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Third week in March:

Atchison, Topeka & Santa Fe	\$125,000	\$80,858	I.	\$38,142	43.9
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Chicago & Alton	86,449	113,959	D.	27,510	24.1
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Chicago & Eastern Illinois	14,797	14,621	I.	176	1.2
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Chicago, Mil. & St. Paul	143,000	136,826	I.	6,174	4.5
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Mo., Kansas & Texas	50,530	58,392	D.	7,862	13.5
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St. Louis, Iron Mt. & Southern	89,250	78,019	I.	10,631	13.5
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Great Western	\$82,469	\$80,530	D.	\$7,061	7.9
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Week ending March 22:					
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Grand Trunk	\$152,554	\$177,671	D.	\$25,117	14.1
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##### Coal Movement.

Coal tonnages reported for the week ending March 22 are as follows:

	1878.	1877.	Increase.	P. c.
Anthracite	404,459	133,082	270,777	202.5
Semi-bituminous	62,678	48,525	14,153	29.2
Bituminous	40,869	32,319	8,550	26.5
Coke	25,672	.....	.....	.....

Clearfield shipments are gaining steadily this year.

The coal production of Nova Scotia for 1878 was as follows:

	1878.	1877.	Inc. or Dec.	P. c.
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Sales and exports	693,511	687,065	I.	6,446	0.9
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Consumption and sales at mines	88,627	98,841	D.	10,214	10.3
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Total	782,138	785,906	D.	3,768	0.5
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Sales reported include some mined in 1877. The actual output for 1878 was: Cumberland County, 113,873; Ficton, 315,895; Cape Breton, 340,056; other, 1,279; total, 770,608 tons. Most of this coal has but a short rail carriage, the exports being chiefly by water.

##### Grain Movement.

Receipts and shipments of grain of all kinds at the eight leading Northwestern markets and receipts at the seven Atlantic ports for the week ending March 22 in each of the past six years have been as follows:

Year.	Receipts.	Shipments.	Atlantic receipts.
1874	1,849,558	1,613,655	1,394,708
1875	1,398,005	1,087,241	1,727,392
1876	1,574,910	1,005,057	1,860,581
1877	1,290,556	670,822	1,450,695
1878	2,728,322	1,830,874	4,041,054
1879	2,811,876	2,371,965	4,624,474

The Northwestern receipts of the week this year are a trifle

below the average of the year, but they are much above the average of last year and still more above the average of any preceding year. The shipments of the three Northwestern markets were much the largest of the year, reflecting doubtless the effect of a prevailing "15-cent rate." There were three weeks last year between the 1st of January and the 23d of March that their shipments were larger. Later reports give the shipments of Chicago alone for the week ending March 22 as 2,063,999 bushels, which is as much as the shipments of all eight of the Northwestern markets in any week from Dec. 1 to March 15 this year. The Atlantic receipts have been exceeded but once before while navigation was closed, and that was the week ending Feb. 15 this year. They were nearly a third greater than the average of the previous winter (which was altogether unexampled), and nearly two and a half times as great as the average weekly receipts of any winter previous to that of 1877-78. These average weekly receipts for the 16 weeks from Dec. 1 to March 22 have been:

Year.	Bushels.	Year.	Bushels.
1873-74	1,845,018	1876-77	1,902,428
1874-75	912,290	1877-78	3,370,526
1875-76	1,811,381	1878-79	3,447,353

These winter receipts of the past two years were above the average of the whole year in 1877 and many other years. Of the receipts at Atlantic ports for the week this year, 38.7 per cent. was at New York, 18.6 at Baltimore, 17.5 at Philadelphia, 13.2 at New Orleans, 12 at Boston, and 0.5 per cent. at Portland. The New Orleans receipts are much the largest of the year, two and a quarter times its average this year, and were exceeded but once in 1878. Philadelphia receipts are also the largest of the year; Baltimore receipts are just about its average since December, but very much less than in any of the four weeks previous to March 9. New York's receipts are about the average since January.

Notwithstanding the great increase in shipments at the great Northwestern markets, the stocks there continue to increase, the receipts being still 440,000 bushels more than shipments. There were more than 13,400,000 bushels of grain in Chicago and 4,200,000 at Milwaukee, 2,900,000 at St. Louis, and 2,200,000 at Toledo March 22—at all the Western markets where stocks are reported, something more than 25,000,000 bushels. At their current rate of carrying from these points, which is nearly the most rapid ever done by rail, it would take the roads more than ten weeks to carry away these stocks. The lake vessels, however, in the four weeks ending Sept. 14 last carried just about this quantity to the East.

Baltimore receipts for March were as follows:

	1879.	1878.	Inc. or Dec.	P. c.	
Flour, barrels.....	147,228	101,754	I.	45,474	44.9
Wheat, bushels.....	1,620,163	513,606	I.	1,106,557	215.5
Corn.....	2,929,504	2,080,468	D.	50,964	1.7
Other grain.....	162,576	94,133	I.	68,443	72.7
Total grain.....	4,712,243	3,588,207	I.	1,125,036	31.4

Total flour reduced to bushels	5,448,383	4,099,977	I.	1,351,406	33.0
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For the three months ending March 31 receipts were:

	1879.	1878.	Increase.	P. c.
Flour, barrels	340,747	304,133	42,614	14.0
Grain, bushels	12,156,584	8,850,374	3,297,210	37.4
Total, bushels	13,890,319	10,380,039	3,510,280	33.8

March exports were 48,617 barrels flour and 4,579,382 bushels grain.

San Francisco receipts for the week ending March 22 were 10,532 barrels flour, 271,930 bushels wheat, 27,523 bushels barley, and 6,817 bushels other grain; total, reducing flour to wheat, 358,930 bushels.

##### Cotton.

Receipts at shipping markets for the week ending March 28 and for the crop year from Sept. 1 to that date (about seven months), are reported as follows, in bales, by the *Commercial and Financial Chronicle*:

	1879.	1878.	1877.	1876.	1875.
Week	60,698	65,470	30,397	59,912	38,531
Crop year	4,119,220	3,893,458	3,731,049	3,737,676	3,194,907

For the crop year the receipts were nearly 6 per cent. greater than in 1878, and 10 per cent. greater than in 1877.

Exports for the week were 58,949 bales this year, against 93,991 last year; for the crop year the exports have been greater by 8½ per cent. this year.

##### Ocean Freights.

Charters at San Francisco have taken an upward turn, rates last week for wheat charters ranging from 44s. per ton to Liverpool to 50s. to Cork for orders. This improvement is due to a smaller amount of disengaged tonnage, and it is said, the good prospects for a heavy wheat crop this year, though why a vessel should hold out for higher rates in March because it is pretty sure to be busy in July is not quite clear.

##### Live Stock Over the Intercolonial.

Last night about nine o'clock a train load of cattle and fresh meat passed through Moncton from the Upper Provinces, en route to Halifax, where the freight will be transhipped for England. The train consisted of fourteen cars, carrying 170 head of cattle and a quantity of dead meat. The train stopped here to give opportunity to feed and water. This is the second shipment of Canadian cattle that will have been made from Halifax for England via the Intercolonial, though several different shipments of dead meat have been made. —*Moncton (N. B.) Times, March 24.*

##### Erie Canal Tolls.

The new toll sheet for 1879 is made out on the principle of charging one-half mill per mile per 1,000 lbs. down freight and one-quarter mill up freight, except for laths, shingles, wood for fuel, lumber, timber, coal and petroleum, which pay the same rates both ways. Cheese, butter, flaxseed and oil-meal and cake have been added to the free list. Flour and corn-meal, which were put on the free list just before the close of last season, are continued there.

This makes the toll 35.4 cents through the whole length of the canal for grain, which is a little more than a cent a bushel for wheat and a little more for corn. This is the same as last year. The articles put on the free list are those which very rarely go by canal. The toll on flour amounts to about 3½ cents a barrel. It cannot be made to go by canal, however, in any considerable quantities.

##### Southern Railway & Steamship Association Rates.

A dispatch from Atlanta, Ga., April 2, says: "There is a heavy cutting of through freight rates by all Southern roads. The Southern railroad pool is threatened with dissolution. Commissioner Powers declares all through rates off, and each line seeks to cut below the others. Rates have been reduced one-half, and are still falling. A meeting will be called to heal the breach, if possible. The fact that several roads have been cutting under rates for some time is the reason for abolishing the rates."

#### THE SCRAP HEAP.

##### Railroad Equipment Notes.

The New York, Lake Erie & Western shops, at Susquehanna, Pa., are building several Consolidation freight engines, and recently turned out a new passenger engine.

The Rogers Locomotive Works, at Paterson, N. J., have completed seven engines for the Central Branch, Union Pacific road.

The Houston & Texas Central shops, at Houston, Tex., have recently turned out a new baggage car and two passenger cars, very handsomely finished.

The Cobourg Car Works, at Cobourg, Ont., have added passenger cars to their manufactures, and have taken a contract to build several. Heretofore they have built only freight cars.

The Central Pacific shops at Sacramento, Cal., recently turned out 18 new cars for the Oakland ferry local trains, which are thus described by the *San Francisco Evening Post*: "The new cars are light in construction, the platforms wide and the step but 16 inches from the ground. The seats are of California laurel with no cushions in which fleas and other vermin can live, and no matter how violently the seat is thrown over, it is protected by the iron falling against a piece of rubber ingeniously placed in the receiving slot. The running gears are protected by 1½ in. wooden bars, four in number, extending the entire length of each car, so that it is impossible for even a small boy to get beneath the wheels."

The Chicago, Burlington & Quincy is building at its Aurora shops some new stock cars with a full length sliding door at each end for convenience in loading lumber, railroad iron and the like.

The Lehigh Car and Manufacturing Company, at Stanton, Pa., has orders for 500 box cars for the New York, Lake Erie & Western, and 1,600 box and coal cars for the Central of New Jersey.

##### Iron and Manufacturing Notes.

The property of the Wyandotte (Mich.) Rolling Mill Company was recently sold by the Assignee, and bought by S. P. Burt, who represents the mortgage debt of \$250,000. It is said that the property is really bought for the Eureka Iron Company.

The rolling mill of the Walsh Iron Company, at Terre Haute, Ind., is running, and 1,030 tons of finished iron were sold last month. The company has started up its blast furnace, using Georgia coke as fuel.

The Portland (Me.) Rolling Mill is running full double turn on orders.

P. H. Lauffman & Co. are running their sheet-iron mill, at Apollo, Pa., to its full capacity on orders.

The Low Moor Iron Company has begun to build a blast furnace at Selma, Allegheny County, Va.

Naylor & Co. have leased the Norton Furnace, at Plattsburgh, N. Y., with the forge and rolling mill attached. They will run the furnace on ore from the Chateaugay bank and make the product into bars for steel making.

The Pennsylvania Steel Company, at Baldwin, Pa., has its rail mill full of work, with orders for several months ahead.

A general improvement in the iron trade is reported, with sales better than for a long time past.

The property of the Lehigh Valley Iron Co., at Coplay, Pa., consisting of three blast furnaces, several hundred acres of ore lands, houses, etc., has been sold at sheriff's sale to Aaron Balliett, one of the managers, for \$140, subject to unascertainable incumbrances. This company recently failed, and the sale is the result of a compromise, by which some of the directors, who had indorsed largely for the concern, obtain control of it.

The track-bolt washers made by the Vulcanized Fibre Co., of Wilmington, Del., have been in use for years on the Concord & Claremont and the Northern roads, in New Hampshire; the Old Colony in Massachusetts; the Eastern Shore road in Maryland, and the Burlington, Cedar Rapids & Northern in Iowa, and are everywhere reported as giving very satisfactory results.

##### Bridge Notes.

Wm. B. Scaife & Sons, of Pittsburgh, are shipping the materials for the iron pier now being built at Long Branch, N. J. The pier is supported on wrought-iron piles, and girders of plate and angle iron. It is to be 660 ft. long and 25 ft. wide, increasing to 50 ft. for about 100 ft. from the seaward end.

The Laclede Rolling Mill, at St. Louis, has a heavy order for iron bridge beams.

##### Prices of Rails.

Steel rails are firm and unchanged, with the mills all full of work. The New York Central is reported to have placed orders for 15,000 tons, but the details of the order have not been made public.

In iron rails a brisk demand is reported, with recent sales of 10,000 tons in lots of from 500 to 2,000 tons. Sales are reported at \$33, cash, per ton at mill for 56 lbs., and \$35 to \$36 for 35 lbs. sections. Prices are firm, with a slight upward tendency, and \$34 to \$36 is quoted for good qualities.

Old rails are quiet, with few offerings. Philadelphia quotations are \$21 to \$22; Pittsburgh \$22.50 to \$23 per ton on cars.

##### Spikes.

A Missouri railroad company, sued for damages for killing a man's wife, pleaded as an offset that he had a new wife, younger, stronger, better-looking and every way superior to the old one, and was consequently benefited and not damaged by the accident. Verdict for defendant.

A tramp of much experience says this broken-stone ballast is a fraud on the traveling public.

A charming young lady recently found a broken rail on the Chicago & Lake Huron road and flagged an approaching passenger train, thereby preventing an accident. The Receiver presented her with a 1,000-mile ticket and she is reported to have received four offers from susceptible railroad men, and now, says a spiteful local paper, the road is lined with young ladies, charming or otherwise, looking for broken rails.

These spring days, when a warm morning comes along, the average passenger brakeman just wades in, piles coal on the stove and puts on all the draft till the temperature in the car is about 140 degrees. Then he puts on his coat and goes at the next car with a clear conscience.

##### A Heavy Train.

Thursday afternoon one of the Modoc engines of the Pennsylvania Railroad (No. 327) tugged a train of cars—all freighted—eastward from Harrisburg to Philadelphia, consisting of 138 cars—110 of which were box cars, and the remainder freighted with coal.—*Attona Call, March 29.*

##### Where He Put the Signal.

Recently an engineer on the First Division of the Atlantic road, while running his engine along at a tremendous rate was suddenly startled to hear the report of a torpedo, which to an engineer is warning of danger ahead. He immediately stopped to ascertain the cause of the signal, and looking ahead espied the trackmaster, whom he asked if he had placed the torpedo on "the track, and his reasons for doing



it, to which he replied that he had, that there was a broken rail, and upon the engineer asking him where, he replied, "Be jabers, and no lie in it, I placed the torpedo on the top of it." And upon investigation it was found that the torpedo had been placed upon the broken rail, sure enough.—*Meadville (Pa.) Reporter.*

#### Switch-Engine Chickens.

A hen at South Carolina Railroad yard, in this city, took a notion a few days since to lay her eggs in the tender-box on Bob Hubbard's switch-engine, and notwithstanding that veteran's views to the contrary, she persisted in getting her work so far advanced that it was deemed prudent to let her "lay." After depositing, as she thought, the usual complement of fresh eggs in order to go into the spring chicken business, she finally settled down to her work and is now daily sitting on her nest. She never leaves the engine only occasionally when it stops in the yard, and then only for a few moments, to fly off, pick around and stretch herself. The engine is in constant use, and crossing and recrossing the city daily, pulling long trains of cars. The engineer has fitted her up with a nice, comfortable cotton nest, and before long expects to have a whole lot of steam-engine chickens.—*Augusta (Ga.) News, March 12.*

#### OLD AND NEW ROADS.

**Allegheny Valley.**—Notice is given that the fund applicable to the payment of coupons due April 1 on the income bonds of this company is insufficient to pay the whole amount. It will therefore be distributed *pro rata*, allowing the sum of \$17.50 on each \$35 coupon to be paid in cash. For the balance of the coupons the company will issue new income bonds, or, for amounts less than \$100, scrip convertible into income bonds, in accordance with the terms of the bonds.

This is an improvement since last October, when only \$12.50 was paid in cash on each \$35 coupon.

**Atchison, Topeka & Santa Fe.**—Messrs. Thomas Nickerson, George C. Lord and O. W. Peabody, trustees, will receive at their office, No. 150 Devonshire street, Boston, until April 15, proposals for the sale to them of \$100,000 of the company's land-grant bonds, in accordance with the terms of the mortgage of Nov. 1, 1870.

A dispatch from Pueblo, Col., states that the work of tracklaying has been begun on the Leadville Extension, and at latest advices seven miles of track had been laid from Canon City westward, carrying the road into the Grand Canon of the Arkansas. It is said that the Denver & Rio Grand will oppose the extension.

**Augusta, Knoxville & Greenwood.**—The grading of this road from Augusta, Ga., northward to Greenwood, S. C., about 60 miles, is advancing from both ends, and nearly two-thirds of the work is finished. The company is now negotiating for the iron.

**Boston, Hoosac Tunnel & Western.**—The Tunnel Committee of the Massachusetts Legislature will report in favor of allowing this company to build a new road from the state line to North Adams.

The arbitrators appointed under the act of 1878 to determine what damage has been done to the Troy & Boston by the building of this company's line through Vermont parallel to the Troy & Boston's leased Southern Vermont road, have decided that the new road is rather a benefit than a damage to the old line, and have awarded the new road a slice of the old right of way.

**Boston & New York Air Line.**—It is stated that the contract between this company and the New York, New Haven & Hartford has been concluded. Under it the New Haven Company will have control of the business of both roads, and will pay the Air Line Company yearly 6 per cent. of the gross earnings of both roads as its proportion. On the basis of last year's business, had this contract been in force, the Air Line would have received \$252,484, while its actual receipts were \$282,861. Probably there will be quite as large a net return under the contract, however, as expenses can be reduced, and it will be relieved from the very heavy terminal charges it is now obliged to pay at New Haven.

The Air Line is 50 miles long, from New Haven, Conn., to Willimantic, and is part of the shortest rail line between New York and Boston. It has never been able to get much of the through business, being absolutely dependent upon the New Haven road for its New York connection, and even for an entrance into New Haven. It has lately been partly abandoned by its Eastern connection—the New York & New England—which now has its own line to Hartford to care for, and apparently prefers to send business over that, to helping to support the Air Line. The road has been quite unable to help itself, and doubtless makes the best possible bargain by this pooling contract, which is for the period of 99 years.

**Boston & Poughkeepsie.**—The town of Great Barrington, Mass., last week voted not to subscribe \$60,000 in aid of this proposed line, as it was asked to do. This probably disposes of the project for the present.

**Burlington & Missouri River in Nebraska.**—On the extension of this company's Republican Valley road, track is now laid from the old terminus at Red Cloud, Neb., westward to Riverton, 15 miles, and the grading is completed some 15 miles further, to Bloomington.

**Central Branch, Union Pacific.**—Tracklaying has been begun on the extension from Beloit, Kan., westward to Cawker City, about 25 miles. The grading of this section is nearly finished, and most of the grading force has been put work west of Cawker City.

**Central, of New Jersey.**—A branch about 1½ miles long is to be built from this road at Centerville, N. J., to Constable's Hook on New York bay, where some large factories are already located and several more are to be built.

**Central Vermont Propeller Line.**—The withdrawal of the steamers of the Northern Transportation Company from the Ogdensburg to the Sarnia route has been noted. It is now announced that in their place four passenger propellers have been engaged to run tri-weekly between Chicago and Collingwood, where they will connect with the Northern Railway of Canada to Toronto, and thence with another line of steamers to Ogdensburg, whence the line will be continued by the Ogdensburg & Lake Champlain and the Central Vermont railroads. This is a much shorter route than that by the Welland Canal to Ogdensburg, but the double transfer will be a considerable objection. It will be one more competitor for through freight at all events.

**Chesapeake & Ohio Canal.**—Water has been let into all the levels and the canal is now open for business for the season.

**Chicago, Milwaukee & St. Paul.**—Contracts were to be let this week for grading an extension of the Iowa & Dakota Division from the present terminus at Pattersville, Ia., westward to Beloit on the Big Sioux River. The distance is 25 miles.

Contracts are also to be let soon for extending the Hast-

ings & Dakota Division 45 miles, from Montevideo, Minn., west to Big Stone Lake.

**Chicago & Northwestern.**—Surveys are being made for a branch of the Winona & St. Peter road to run from Tracy, Minn., 238 miles west of Winona, westward to the Big Sioux River at Medway, Dakota. The distance is about 50 miles.

**Chicago, St. Louis & New Orleans.**—Work on the ballasting of this road, which has been in progress for two years past, has been resumed, and about 100 miles of track will be ballasted this season. The gravel is taken from pits owned by the company at Brookhaven and Chatawa, Miss. About 3,000 tons of steel rails are to be put in the track this season. The company last year added 10 engines and 875 freight cars to its equipment.

Since the extension of the road from Fillmore to East Cairo the time occupied in the transfer across the Ohio to or from Cairo has been reduced to about twenty minutes, saving more than an hour in time.

**Chicago, Worthington & Washington.**—Steele and Elmore townships in Daviess County, Ind., have each voted to donate 2 per cent. of their taxable valuation in aid of this road, which the company expects to build this season. It is to run from Washington, Ind., by way of Worthington to Terre Haute, about 90 miles.

**Columbus, Chicago & Indiana Central.**—The Trustees and Receivers give notice that they will pay, on presentation at the office of A. Iselin & Co., No. 48 Wall street, New York, coupons due Oct. 1, 1878, on Union & Logansport 7 per cent. bonds; also coupons due Jan. 1, 1879, on Indiana Central 10 per cent. bonds.

**Cumberland & Ohio, Southern Division.**—On this road, which the Louisville & Nashville Company is building as lessee, track was laid during March for five miles south from the Rolling Fork bridge, making a total of 10 miles built from the junction with the lessee's road at Lebanon, Ky.

**Davenport & Northwestern.**—A Davenport (Ia.) dispatch of March 24 says: "About two years ago a suit was commenced in the United States Circuit Court against a number of our prominent citizens for the recovery of about \$1,000,000, based upon matters growing out of the construction of the Davenport & St. Paul Railroad. The suit was brought on behalf of the bondholders against the members of the construction company. It was claimed by the bondholders, among other things, that on account of a defective organization of the construction company, its members were individually liable for the debts and defaults of the corporation. The defendants filed a plea showing that the company was a legal corporation notwithstanding the defects. Saturday, at Des Moines, Judge Love decided the case in favor of the defendants, thus relieving them from individual liability for the construction company's debts."

**Detroit River Tunnel.**—Much discussion has been aroused at Detroit by the statement that arrangements had been made to build a tunnel under the Detroit River at Grosse Isle for the Canada Southern road. It is thought that this would divert much of the through business from Detroit, and there is a strong movement for a crossing by bridge or tunnel at that city.

At Grosse Isle the Canada Southern already has bridges over the channels between the American shore and Grosse Isle and between that island and Stony Island, leaving only the main channel to be crossed. The proposed tunnel, it is said, will be 3,750 feet long and will have two arches, each for one track. The arches will be 18 feet high and 15 feet wide each. The grade of the approaches will not be over 120 feet to the mile. The company has thus far declined to make any definite statement as to its intentions.

**Illinois & Michigan Canal.**—The Board of Canal Commissioners announced that this canal was to be opened from Bridgeport (Chicago River) to La Salle, Ill., March 29. Boats are allowed to draw 4 ft. 8 in.

**Iowa City & Western.**—Local papers report that this company will build this year from Iowa City, Ia., southwest to Riverside, the terminus of the Muscatine Division of the Burlington, Cedar Rapids & Northern, and thence up English River to the coal-fields in Keokuk County, about 50 miles in all. The Burlington, Cedar Rapids & Northern Company will, it is said, aid in building the road, and lease it when finished.

**Iowa Railroad Taxation.**—The Iowa Executive Council has completed its annual valuation of the railroads of the state for the purposes of taxation, fixing their values as follows:

	Miles.	Val. pr. mile.
Burlington, Cedar Rapids & Northern.....	229.06	\$4,300
Milwaukee Division.....	95.61	2,500
Pacific Division.....	49.18	4,000
Muscatine Division.....	30.90	2,000
Iowa City Division.....	9.75	2,000
Burlington & Northwestern.....	34.13	900
Leon Branch.....	37.700	2,000
Burlington & Southwestern.....	79.00	2,300
Central of Iowa.....	189.05	4,000
Chicago, Burlington & Quincy.....	282.926	12,000
Knoxville Branch.....	33.216	2,000
Indianola Branch.....	16.900	2,000
Brownville Branch.....	14.190	2,000
Greenfield Branch.....	20.500	2,000
Leon Branch.....	37.700	2,000
Sidney Branch.....	21.050	2,000
Creston Branch.....	42.075	4,000
Keokuk & St. Paul Branch.....	42.466	3,000
Nebraska City Branch.....	39.291	3,000
Chicago, Clinton, Dubuque & Minnesota.....	183.20	3,300
Chicago, Milwaukee & St. Paul.....	94.788	5,800
Iowa & Dakota Division.....	252.902	3,300
Western Union Division.....	335.80	2,300
Chicago & Northwestern.....	355.01	10,300
Iowa Midland Division.....	68.80	2,000
Maple River Division.....	60.15	2,300
Stanwood & Tipton Division.....	8.51	2,500
Chicago, Rock Island & Pacific.....	318.08	11,000
Audubon Branch.....	24.54	2,000
Harlan Branch.....	11.84	2,000
Indiana Southern & Mo. Northern.....	129.38	5,000
Indianola & Winteret Branch.....	48.24	2,500
Onkalosa Branch.....	128.18	3,000
Keokuk Branch.....	102.20	3,500
Crooked Creek.....	8.50	600
Davenport & Northwestern.....	160.53	2,500
Des Moines & Fort Dodge.....	83.80	3,000
Des Moines & Minneapolis.....	56.73	1,300
Des Moines, Adel & Western.....	7.00	800
Fort Dodge & Fort Ridgely.....	13.375	2,200
Grinnell & Montezuma.....	329.58	5,300
Illinois Central.....	75.58	3,300
Cedar Falls Division.....	19.10	900
Iowa Eastern.....	17.00	2,000
Iowa, Minnesota and North Pacific.....	3.00	3,000
Iowa Railway, Coal & Mfg. Co.....	539.008	8,000
Kansas City, St. Jo & Council Bluffs.....	14.79	2,300
Missouri, Iowa & Nebraska.....	30.25	3,000
St. Louis, Kansas City & Northern.....	43.31	3,000
St. Louis, Ottumwa & Cedar Rapids.....	80.47	3,500
Sioux City & Pacific.....	17.60	2,500
Sioux City & Pembina.....	57.25	3,500
Sioux City & St. Paul.....	3.00	2,000
Toledo & Northwestern.....	15.00	900
Waukon & Mississippi.....		

The Council also assessed a penalty of \$10,400 against the Kansas City, St. Jo & Council Bluffs for failure to make return as required by law.

The property of the Pullman Palace Car Company was assessed at \$87,419. The increase in the valuation of railroad property in the state is over \$800,000, and it is estimated that the taxes levied on railroad property this year will average about \$150 per mile of road.

**James River & Kanawha Canal.**—The stockholders of this company have approved the contract for the transfer of the canal to the Richmond & Allegheny Railroad Company, under the provisions of the act lately passed by the Virginia Legislature. The stockholders of the Railroad Company have also approved the contract.

The Richmond & Allegheny Company is making arrangements for a settlement with the creditors of the canal company, and will, it is said, begin work very soon on the railroad which it is to build on the line of the canal.

**Ligonier Valley.**—The following statement of earnings for 1878 is made:

Gross earnings (\$920 per mile).....	\$9,195.40
Expenses (42.24 per cent.).....	3,885.91
Net earnings (\$531 per mile).....	\$5,309.49

The road is 3 ft. gauge and 10 miles long, from Latrobe, Pa., to Ligonier.

**Macon & Augusta.**—The order obtained some time ago to enjoin the trustee from selling this road to satisfy the lien of the Georgia Railroad Company for coupons paid has been dissolved, and the road will be sold after due notice.

**Marietta & North Georgia.**—Track on this road is now laid to Canton, Ga., on the Etowah River, 23 miles northward from Marietta. Canton is a flourishing village, the centre of a fertile country, and is expected to give the road considerable traffic.

**Massachusetts Railroad Commission.**—A bill is before the Massachusetts Legislature to abolish the Boston Harbor Commission and Land Commission and transfer their duties to the Railroad Commission, increasing the number of commissioners from three to five to meet the increased work. It is urged that the work of the Harbor and Land Commissions is nearly related to that of the Railroad Commission, and that one board can do all the work at a smaller expense for administration. The Land Commission has charge of the South Boston flats, where it is hoped one day to make the freight terminus of all the Boston lines.

**Missouri, Iowa & Nebraska.**—Work on the extension of this road from Centerville, Ia., westward is being pushed by Whitney & Son, contractors for the grading.

**Montgomery & Eufaula.**—It is announced that the Louisville & Nashville Company has secured a majority of the bonds of this company, and will control the reorganization. This is not unexpected, as it has been believed for some time that bonds were being secured in the Louisville & Nashville interest. The road, which is now in the hands of trustees pending a foreclosure and sale, extends from Montgomery, Ala., east by south to Eufaula, 80 miles, and will carry the Louisville & Nashville into Eastern Alabama, and to the Chattahoochee River.

**Nashville & Florence.**—This company has been organized to build a railroad from Columbia, Tenn., southwest by Lawrenceburg to Florence, Ala., about 70 miles. It is proposed to use the road-bed graded some years ago by the old Tennessee & Alabama Company, from Columbia to Mt. Pleasant.

**New Jersey Southern.**—Jay Gould and others, claiming to own the Long Branch & Sea Shore road, which is now part of the New Jersey Southern road, extending from Sandy Hook wharf to Long Branch, have obtained from the New York Supreme Court an injunction to prevent the sale of this road, and to prohibit the execution of a contract made by the representatives of the Southern Railroad bondholders for the lease of the road to the Central Railroad Company of New Jersey as soon as the said bondholders shall have purchased the road and completed a reorganization.

As both the Central and the Southern roads are in New Jersey, and both are at present under the control of the New Jersey Court of Chancery through receivers, it is very possible that the sale and reorganization of the Southern road may be carried out without paying any attention to the mandate of the New York court.

The road was sold March 31, as noted elsewhere, and bought in by the bondholders.

It is said that the agreement made by the bondholders for the lease of the road to the Central, of New Jersey, provides that the Central shall purchase and take assignments of the various prior liens, subject to which the road was sold, amounting to \$510,000, and shall also advance money to pay expenses of reorganization and the *pro rata* share of the purchase money due to unanswering bondholders. The rental is to be the interest on the \$200,000 Long Branch & Sea Shore bonds, and on \$1,200,000 first mortgage 6 per cent. bonds to be issued by the new company. The agreement is not made directly with the Central, but with the New York & Long Branch Company, nearly all the stock in which is held by the Central. The lessee, in return for the advances to be made, is to have all the stock to be issued by the new company. It is understood, also, that the lease of the Vineland Railroad, from Atsion to Bay Side, will be assumed by the lessee. The bonds of the new company are to be issued to holders of the old first-mortgage bonds, to the amount of 60 per cent. of their present holdings.

**New York, Lake Erie & Western.**—The contract for the new depot in Buffalo has been let to Joseph Churchyard, of Buffalo, for \$13,000; for the engine-house at East Buffalo, to C. S. Chapin, for \$42,000, and for the machine shop and other buildings at East Buffalo, to Schmidt Brothers, for \$31,000. All the contractors are to begin work at once.

A published statement of the earnings of this road is as follows:

Gross earnings, Oct. 1, 1876, to March 15, 1878.....	\$7,082,000
Estimated earnings, March 15-31.....	830,000
Total gross earnings, six months.....	\$7,912,000
Working expenses (partly estimated).....	5,127,000
Net earnings.....	\$2,785,000
Less estimated loss on leased lines over income from securities, etc.....	200,000
Net balance.....	\$2,585,000

The total interest charges for the current year will be \$2,050,085, less than the estimated balance already earned. The first two weeks of March showed an increase of \$136,671 over the same period in 1878.

**New York Elevated.**—With reference to a recent collision on this road, the Grand Jury of the County of New York has made a presentment, censuring the company for not providing proper safeguards and signals.

In order to prevent danger from crossings, the company



announces that it will run through trains hereafter on its main line only, and passengers taking the branch lines will have to transfer at the junctions. The working of the City Hall and Grand Central Depot branches is temporarily suspended, until proper transfer stations can be provided.

**New York & New England.**—From statements made to a committee of the Massachusetts Legislature, it appears that on Oct. 1 last there were \$400,000 of the new bonds outstanding. In October \$3,000,000 were placed through a syndicate, and the company has sold \$988,000 at prices varying from 94 to 108. The proceeds of these bonds were used as follows:

Underlying bonds on old road.....	\$631,702.72
Note due the state.....	250,000.00
Notes of same class due other parties.....	500,000.00
Notes due Oct. 1, 1878, mainly for steel rails.....	156,977.24
Hartford, Providence & Fishkill purchase.....	2,223,938.05
Total.....	\$3,702,618.01

The total amount received is not stated, but it is reported that the syndicate took the \$3,000,000 bonds at 80.

**New York Regulation of Rates.**—The New York Assembly has passed by large majorities, this week, the bill limiting charges on milk carried to New York to three cents per gallon; also the bill limiting passenger fares on the New York, New Haven & Hartford road to two cents per mile in summer and 2½ cents in winter.

**Northern Pacific.**—On the 31st ult., Senator Grover, of Oregon, introduced a bill in the Senate which provides that the time for the completion of its main line shall be extended ten years, upon conditions, which are in substance, as follows:

First—That the company shall, within one year of the enactment of the bill, begin work on the main line at or near Umatilla, Oregon, and complete not less than 200 miles of its road eastward every year thereafter, and shall construct a total of at least 100 miles of the main line within two years from the same date, and not less than 100 miles of the main line each year thereafter, including the 25 miles per annum expressly designated. Secondly—That the main line between Portland and Umatilla shall be constructed on the south side of the Columbia. Thirdly—That with the exception of lands heretofore earned by the company, all agricultural lands within its grant shall be open to purchase from the company by actual settlers in tracts of 160 acres each at the price of \$2.50 per acre. The extension of time and the continuance of all former rights and franchises are also made conditional upon the requirements that the said company shall complete its road around the Cascades of the Columbia River within two years, and around the Dalles of the Columbia within three years from the enactment of this bill, and that in the use of these portage railroads the company shall make no discriminations or excessive charges against any person or corporation. All lands heretofore withdrawn for the branch line are to be restored to the public domain, except for a distance of twenty miles north of the portion now completed from Tacoma to Wilkeson, W. T. The bill embodies the provisions of the House bill of last year protecting the rights of homestead and preemption settlements made prior to the receipts of orders of withdrawal at the local land offices, and, in conclusion, authority is reserved for Congress to amend or repeal this act at any time (having due regard for the rights of the company), and to provide by law against discriminations and excessive charges.

**Peoria & Hollis.**—This company has been organized to build a line eight miles long from Peoria, Ill., to Hollis, to be used by the Toledo, Peoria & Warsaw road. The capital stock is to be \$80,000, and the road when done is to be leased to the Toledo, Peoria & Warsaw at \$15,000 a year.

**Philadelphia & Reading.**—This company's statement for February and the three months of its fiscal year ending Feb. 28 is as follows:

	February	Three months	February	Three months
Gross earnings:	1879.	1878.	1879.	1878.
Railroad traffic.....	\$825,154	\$482,238	\$2,536,527	\$2,290,441
Canal traffic.....	1,223	571	9,000	17,708
Steam coalers.....	51,488	42,601	150,850	168,367
Richmond barges.....			14,359	17,878
Total R. R. Co.....	\$877,865	\$525,410	\$2,716,736	\$2,503,394
Coal & Iron Co.....	851,396	319,000	1,558,092	1,479,063
Total.....	\$1,429,261	\$844,470	\$4,274,828	\$4,082,457
Traffic:				
Passengers carried.....	418,056	390,057	1,427,118	1,402,083
Tons merchandise.....	221,800	237,282	722,378	714,784
Tons coal.....	519,001	173,492	1,343,809	1,052,513
Tons coal on colliers.....	44,086	44,114	122,350	141,618
Tons coal mined:				
By coal & Iron Co.....	260,001	65,081	682,236	524,446
By tenants.....	80,082	28,047	228,754	173,133
Total.....	340,083	93,728	910,990	697,579

The railroad company shows an increase in gross receipts of \$352,455 or 67.1 per cent., for February, and of \$213,342, or 8.5 per cent., for the three months. Both companies together increased their gross receipts in February \$584,791, or 69.2 per cent., and in the three months \$192,371, or 4.7 per cent. These gains were due entirely to the great increase in coal traffic this year.

**Pittsburgh Southern.**—A meeting of stockholders was held in Pittsburgh last week to consider the financial troubles of the company. After some discussion it was decided to mortgage the road for \$7,500 per mile, provide for an arrangement could be made with the creditors. An informal meeting of creditors was also held, at which Robert Arthur, J. H. Hopkins and J. W. Koontz were appointed a committee to confer with the company. President Py and T. G. Kammerer were added on behalf of the company, and the joint committee will prepare a plan of settlement to be submitted to a general meeting of creditors, to be called soon.

**Pittsburgh, Wheeling & Kentucky.**—At the recent annual meeting a resolution was passed authorizing the extension of the road from Wheeling, W. Va., down the river to Benwood, about four miles. The extension will accommodate a number of mills and factories.

**Pullman Palace Car Co.**—A bill is pending before the Ohio Legislature to regulate this company's charges for sleeping and palace cars. It fixes rates at 25 cents per day or night for a single berth, chair or sofa; 50 cents for a section; \$1 for a state-room, with 25 cents additional for each extra berth made up therein.

**Raleigh & Augusta Air Line.**—A number of stockholders and others interested in this road and the Raleigh & Gaston, last week made a special trip of inspection over the two roads from Weldon, N. C., to Hamlet.

**Reading & Lehigh.**—The Reading (Pa.) Journal says: "It is rumored that an important railroad litigation is

about to be commenced in this city against the Reading & Lehigh Railroad Company as terre-tenants, and the Philadelphia & Reading Railroad Company as lessees. Messrs. Britton & Doane, contractors who did considerable work on several sections of the Berks County Railroad in 1871 and 1872, are claimants to the amount of about \$13,000 for a balance due them on their contract, and are seeking to recover the same from the present management of the railroad. Other labor claims amounting to about \$300,000 are said to be awaiting the disposition of the suit to be shortly instituted, the initial proceeding of which, it is said, will be the issuing of a writ of *seque facias* against the Reading & Lehigh Railroad Company to obtain judgment."

**Richmond & Youngstown.**—This company has filed articles of incorporation in Ohio, to build a narrow-gauge railroad from Youngstown, O., southward to Richmond, in Jefferson County, a distance of about 50 miles. The capital stock is to be \$250,000.

**St. Louis & Southeastern.**—Notice is given that the time in which holders of consolidated bonds may deposit their bonds with the Continental National Bank in New York and assent to the agreement for reorganization, has been extended to and including April 9.

The Louisville Courier-Journal of April 1 says editorially: "We print elsewhere in this issue the details of a highly important move in railroad combinations, being the transfer of the securities of the St. Louis & Southeastern Railroad Company to the Louisville & Nashville Railroad Company, through a long and patient course of purchasing on the open market. The St. Louis & Southeastern Railroad will consequently pass under the control of the Louisville & Nashville Railroad Company, and no railroad event of such importance has occurred in the South for many years. Those acquainted with the Green Line and its relations to the South and West can readily estimate its significance without help from us. Since railroad combinations have assumed such gigantic proportions in the North, it would seem in the line of Southern interests to consolidate in like manner."

**St. Paul, Stillwater & Taylors' Falls.**—The suit of this company against the St. Paul & Pacific, to determine the title to a strip of land along the levee at St. Paul, Minn., has been decided by the Minnesota Supreme Court against this company, leaving the St. Paul & Pacific in possession of the property. It is estimated that the value of the land is from \$125,000 to \$150,000. The opinion decides several interesting questions as to whether the boundary line of property extends to the river's edge or the middle of the Mississippi, and as to whether the strip in question was formerly attached to the main land or was an island.

**St. Paul Union Depot.**—At a meeting of representatives of the lines entering St. Paul, Minn., last week, it was resolved to locate the proposed Union Depot on the ground now occupied by the St. Paul & Pacific. Plans will be adopted and work begun as soon as this decision can be ratified by the companies.

**Savannah & Charleston.**—The Court has authorized the Receiver of this road to borrow \$75,000 for the purpose of putting the road in thorough repair and making some improvements. The order was opposed by the bondholders, some of whom threaten to appeal.

**Shenango & Allegheny.**—Negotiations are pending for the extension of this road from its present terminus at Hilliard, Pa., eastward about eight miles to Parker on the Allegheny Valley road. The company is willing to build, if a reasonable amount can be raised in Parker.

**Southern Pacific.**—The terminal station in Arizona this week is at Gila Bend, 120 miles eastward from Yuma and 839 miles from San Francisco. Tracklayers and graders are working steadily forward toward Maricopa Wells and Tucson.

**Toledo, Peoria & Warsaw.**—The Court has authorized Receiver Hopkins to lease a new road from Hollis, Ill., to Peoria, eight miles, which is to be built in the interest of this road, but by a separate organization. The road now uses the Peoria, Pekin & Jacksonville track between the two places. The Receiver is authorized to agree to pay \$15,000 a year rent for the new road.

**Toledo, Indianapolis & Western.**—This is to be the name of a new company to be formed by the consolidation of the Toledo & Maumee, the Toledo & Grand Rapids and the Toledo, Delphos & Indianapolis, all narrow-gauge roads. Articles of consolidation have been agreed upon and will be submitted to the stockholders of the respective companies. The Toledo & Maumee has some eight miles of road running out of Toledo; the Toledo, Delphos & Indianapolis has some 20 miles of road nearly or quite ready for use.

**Union Pacific.**—This company has served upon Henry S. McComb the summons and complaint in the action to have him refund the sums of money which it is alleged he received as his share of the profits of the Crédit Mobilier of America, which constructed the road. This is only one of a number of suits which are to be brought against all the persons who received similar profits under the same circumstances. The complaint is very long and goes over the whole history of the contracts for the building of the road. The specific allegations are that Mr. McComb was concerned in the Hoxie contract for building 247 miles from Omaha west; in the subsequent contract for 138 miles more, and in the Oakes Ames contract for 667 miles, all of which were assigned to trustees, of whom McComb was one. The complaint charges that he received a share in the profits from all these contracts and that he was a stockholder in the Crédit Mobilier of America, and shared in its gains. It is claimed that large sums were paid on the contracts at a time when the Treasurer and a number of the directors were also stockholders of the Crédit Mobilier and concerned in the contracts. It is further alleged that these wrongful acts were only known by the participants until the time of the Congressional investigation in 1873; that then the railroad company repudiated the contracts and called upon the wrongdoers to make restitution; that these persons have never made settlement, claiming further payments; that McComb refuses to settle. The company, therefore, asks that all these contracts be declared void and set aside; that an account be taken of the amounts McComb has wrongfully received, and he be decreed to pay their value; that McComb be enjoined from any disposition of the securities held by him under the contracts. The executors of George Griswold Gray are the only other parties who have been served with papers in the suits that are to be brought against the other leading participants in the alleged conspiracy. The actions are brought in the New York Supreme Court.

**Utah & Northern.**—Work on this road has been resumed for the season and is being pushed forward actively. Last week the rails had been laid for 13 miles northward from the winter terminus at Blackfoot, Idaho, making 219 miles from Ogden, Utah.

**Viroqua.**—Work has been resumed on this road, which is to be extended from the winter terminus at Melvin south to Viroqua, Wis., 25 miles. The road will be 38 miles long

in all, from Sparta on the Chicago, Milwaukee & St. Paul to Viroqua.

**Wabash.**—In the suit of Meloy against this company, the Circuit Court at Urbana, Ill., holds that the equipment bonds issued by the Toledo, Wabash & Western Company in 1862, are included in and secured by the consolidated mortgage of 1867. The plaintiff has the right to proceed to enforce the payment of his bonds, and to obtain judgment for the amount due, and, upon failure to pay such judgment, to ask a decree of sale under the consolidated mortgage. The motion for the appointment of a receiver is denied, on the ground that there is no evidence that the property of the company is being improperly managed.

Another suit has been begun in the Brown County (Ill.) Circuit Court by Levi Holbrook, a holder of Quincy & Toledo bonds, who seeks to recover on his bonds and enforce their claim as a first lien upon the 33 miles of road from Clayton, Ill., to the Illinois River.

The company has refused to allow the examination of its books ordered by the Illinois Circuit Court in the Meloy suit.

A dispatch from Indianapolis, April 2, says: "The report of the dismissal of the suit pending in the Fountain County Circuit Court for the appointment of a receiver for the Wabash Railroad Company, sent, on March 31, was an error. The hearing of the case was postponed until April 8."

**Worcester & Nashua.**—The following notice to bondholders has been published:

"It is proposed, as soon as possible, provided all parties assent to the reduction of interest, to secure the bonds by a mortgage."

"The board of directors have this day voted to pay interest at the rate of only 5 per cent. per annum. Parties holding bonds to the amount of about \$600,000 have already approved of the plan, and it is necessary for all parties to agree to this plan at once. \* \* \*

"Interest on bonds of Worcester & Nashua and Nashua & Rochester Railroad, falling due April 1, will be paid at their office in Worcester, Mass.—and not at the Globe Bank in Boston—at the rate of 5 per cent. per annum."

A called meeting of stockholders was held in Worcester, Mass., March 31, and it was voted to approve the proposed modifications of the Nashua & Rochester lease. It was also voted to authorize the execution of a mortgage on the road, and an issue of \$200,000 new bonds for the purpose of funding the floating debt.

## ANNUAL REPORTS.

### Memphis & Charleston.

This company owns a line from Memphis, Tenn., to Stevenson, Ala., 272 miles, and branches from Moscow, Tenn., to Somerville, 14 miles; from Tusculum, Ala., to Florence, 5 miles, and to the levee in Memphis, 1 mile, making 292 miles in all. Its trains use the Nashville, Chattanooga & St. Louis track from Stevenson to Chattanooga, Tenn., 38 miles. The road is leased to the East Tennessee, Virginia & Georgia Company, but a separate report is made for the year ending June 30, 1878.

The equipment consists of 37 engines; 3 sleeping, 12 first-class and 14 second-class passenger and 12 baggage, mail and express cars; 444 box, 24 stock, 128 flat and 59 coal cars; 1 pay and 2 boarding cars.

The general balancesheet is as follows:

Stock (\$18,194 per mile).....	\$5,312,725.00
Bonds (\$14,452 per mile).....	4,220,000.00
Coupons.....	114,008.80
Suspense account, etc.....	87,475.74
Income account, earnings.....	980,850.67
Bills, accounts and balances.....	137,504.22
Total.....	\$10,842,500.43
Construction and equipment (\$29,502 per mile).....	\$8,040,954.00
Real estate, stocks, etc.....	313,037.82
Income, expenses, interest, etc.....	1,032,087.30
Cash, materials and receivables.....	353,818.70
Profit and loss.....	501,402.61
Total.....	10,842,500.43

Through the transactions noted in last year's report the bonded debt shows a net reduction of \$913,913.18.

The earnings for the year were as follows:

	1877-78.	1876-77.	Inc. or Dec.	P. c.
Freight.....	\$531,085.54	\$491,505.01	I. \$39,580.53	8.0
Passengers.....	383,232.92	302,734.69	D. 8,501.77	2.4
Mail and express.....	42,442.22	42,880.19	D. 437.97	1.0
Rents, etc.....	33,005.99	34,170.50	D. 1,074.90	3.1
Total.....	\$989,856.67	\$901,350.48	I. \$88,506.19	3.0
Expenses.....	682,411.87	643,827.50	I. 38,584.37	6.0
Net earnings.....	\$307,444.80	\$317,522.98	D. \$10,078.18	3.2
Gross earn. per mile.....	3,389.92	3,262.30	I. 127.62	3.0
Net ".....	1,052.89	1,087.40	D. 34.51	3.2
Per cent. of exps.....	68.94	69.97	I. 1.07	2.9

The payments other than for operating were as follows:

Net earnings.....	\$307,444.80
Interest.....	\$305,121.30
Real estate, lot in Memphis bought.....	6,480.61
New steel rails.....	38,004.46
Total.....	350,575.43

Deficit, increase of debt..... \$43,130.63

It is considered, however, that the improved condition of the road fully offsets this deficit. The cost of steel rails is only a temporary charge, to be paid from future earnings.

The traffic for the year was as follows:

	1877-78.	1876-77.	Inc. or Dec.	P. c.
Train mileage.....	335,306	409,280	D. 103,914	32.8
Passenger.....	310,562	305,006	I. 4,950	1.6
Freight.....	66,945	33,385	I. 33,560	100.5
Service.....	21,900	21,900	D. 60	0.3
Switching.....	734,773	860,231	D. 125,458	14.6

Total.....	126,93 cts.	87.24 cts.	I. 39.69 cts.	45.6
Earnings, passenger.....	171.01 "	100.80 "	I. 10.21 "	6.3
" freight.....	148.12 "	115.00 "	I. 33.12 "	28.8

Expenses, all revenue trains.....	105.65 "	79.98 "	I. 25.67 "	32.1
Net earnings.....	42.47 "	35.02 "	I. 7.45 "	21.3
Bales cotton carried.....	195,583	200,281	D. 4,698	2.3
Total tons freight.....	158,458	138,812	I. 19,646	14.2

Locomotive service cost 18.28 cents per mile run, an increase of 1.6 per cent. over the previous year. The decrease in cotton was in Memphis shipments, local and crossing shipments keeping up well. The decrease in passenger train mileage is due to the running of only one through train for a large part of the year.

There was paid last year \$54,190.18 tolls on business over the Nashville, Chattanooga & St. Louis between Stevenson and Chattanooga, and \$12,483.90 for delivering local cotton, a total of \$67,034.08, which is not included in either earnings or expenses.

Track renewals included 51.7 miles of rolled iron and 98,438 ties. Two new iron bridges were built, one to replace a wooden one burned. One passenger and 38 flat cars were built, and 40 short coal cars begun.

The East Tennessee, Virginia & Georgia has continued to work the road through the officers of this company as its



agents; it was provided in the lease that such a course might be taken.  
References is made to the yellow fever, the effects of which, however, were not felt until after the close of the fiscal year.

### Wabash.

The property worked by this company is as follows:

	Miles.
Toledo, O., to Camp Point, Ill.	452.10
Clayton, Ill., to Elvaston.	35.10
Bluffs, Ill., to Naples.	5.00
Decatur, Ill., to East St. Louis.	100.40

Total owned.	600.20
Camp Point to Quincy, used jointly with U. R. & Q.	21.77
Elvaston to Hamilton, used jointly with T. P. & W.	6.48
Naples to Hannibal Bridge and Pittsfield Branch.	40.60
	77.85
Total worked.	678.05

The equipment consists of 197 locomotives; 67 passenger and 30 baggage, mail and express cars; 2,712 box, 303 Red Line, 119 Diamond Line, 197 Canada Southern Line, 508 stock, 386 platform, 486 coal and 101 caboose cars; 1 directors', 5 wreck and 30 dump cars. The report is for the year ending Dec. 31.

No balance sheet is given, but the following statement is made of bonded debt with the proportion which has been assigned to the funding agreement made when the present company was formed:

	Total amount.	Amount funded.	Balance.
Toledo & Illinois first mortgage.	\$900,000	\$895,000	\$5,000
Lake Erie, Wabash & St. Louis, first.	2,500,000	2,474,000	26,000
Great Western, first.	2,500,000	2,480,000	20,000
Illinois & Southern Iowa, first.	300,000	295,000	5,000
Quincy & Toledo, first.	500,000	490,000	10,000
Decatur & East St. Louis, first.	2,700,000	2,638,000	62,000
Great Western, second.	2,500,000	2,440,000	60,000
Toledo & Wabash, second.	1,000,000	836,250	163,750
Wabash & Western, second.	1,500,000	1,285,000	215,000
Toledo, Wabash & Western, consolidated.	2,610,000	2,554,000	56,000
Total.	\$17,010,000	\$16,400,150	\$609,850

This does not include the so-called Seney mortgage, the \$2,000,000 proposed new mortgage, nor the equipment bonds now in dispute. The amount given above is \$28,350 per mile of road owned.

The traffic for the year was as follows:

	1878.	1877.	Inc. or Dec.	P. c.
Train mileage:	1,227,810	1,181,177	I.	46.663
Passenger.	3,019,472	2,689,435	I.	330,037
Freight.	1,069,418	930,732	I.	138,686
Service and switching.	5,316,700	4,801,344	I.	515,356
Total.	5,316,700	4,801,344	I.	515,356

	1878.	1877.	Inc. or Dec.	P. c.
Car mileage:	6,146,920	5,937,985	I.	208,935
Passenger train.	79,377,985	79,377,985		
Freight.	1,163,881	893,543	D.	34,694
Service.	858,879	30,977,180	I.	3,217,063
Passenger mileage.	43,104,183	1,952,003	I.	521,137
Tons freight carried.	1,952,003	1,430,860	I.	36.4
Tonnage mileage.	501,834,839	380,068,034	I.	121,766,805

	1878.	1877.	Inc. or Dec.	P. c.
Av. train load:	35.2	33.8	I.	4.1
Passenger, number.	106.2	141.1	I.	25.1
Freight, tons.				17.8

	1878.	1877.	Inc. or Dec.	P. c.
Per passenger per mile.	2.730 cts.	2.820 cts.	D.	0.090
Per ton per mile.	0.093	0.225	D.	0.132

Locomotive service cost 16.78 cents per mile run. The average passenger train was 5.05 cars; loaded freight, 22.38 cars. Cost per car per mile, passenger, 5.05 cents; freight, 0.85 ct. Of the freight-car mileage 44.7 per cent. was east bound, loaded; 5.4 per cent. east bound, empty; 28.6 per cent. west bound, loaded; and 26.3 per cent. west bound, empty, making 68.3 per cent. loaded and 31.7 empty.

During the year, 29 box cars and four cabooses were built, 264 cars rebuilt, and 588 received general repairs. A number of cars need to be rebuilt, and 800 new cars are needed, 500 of which are under contract.

During the year a trestle bridge was filled in, 8 1/4 miles new sidings laid, a new freight yard made at East St. Louis, and 16 miles ballasted. Renewals included 72 1/2 miles new steel, 11 1/4 miles new iron and 322,028 new ties. There are now 379 1/2 miles laid with steel.

The earnings for the year were as follows:

	1878.	1877.	Inc. or Dec.	P. c.
Freight.	\$3,514,960.61	\$3,162,524.57	I.	\$352,436.04
Passenger.	1,170,846.84	1,126,497.41	I.	53,349.43
Mail and express.	228,017.72	223,102.68	D.	5,084.00
Miscellaneous.	75,507.63	63,789.64	I.	11,717.99
Total.	\$4,998,371.80	\$4,585,914.30	I.	\$412,457.50
Expenses.	3,474,945.16	3,320,801.41	I.	154,143.75

	1878.	1877.	Inc. or Dec.	P. c.
Net earnings.	\$1,523,426.64	\$1,265,112.89	I.	\$258,313.75
Gross earn. per mile.	7.372	6.763	I.	0.608
Net earn. per mile.	2.246	1.852	I.	0.394
Per cent. of exp.	69.52	72.61	D.	3.09

There was a considerable increase in through passenger earnings, but a loss on local and on mail and express business. Payments from net earnings were as follows:

	1878.	1877.	Inc. or Dec.	P. c.
Net earnings.	\$1,523,426.64	\$1,265,112.89	I.	\$258,313.75
Interest on bonds and certificates.	\$1,246,644.98	\$1,246,644.98		
Rent of track, C. R. & Q. R. R.	22,633.39	22,633.39		
" " T. P. & W. R. R.	10,000.00	10,000.00		
Rent of Hannibal & Naples R. R.	32,910.66	32,910.66		
Rent of Wabash Equipment Co. cars.	40,330.00			
				1,352,515.03
Surplus.	\$170,911.61			
Paid for permanent improvements, lands, sidings and equipment.	239,597.78			
Excess of payments.	\$68,686.15			

General Manager Hopkins' report says: "If the average (freight) rate of 1877 could have been obtained in 1878, the net earnings would have been about \$2,186,000, or about \$663,000 more than the actual net earnings as shown above."

"Under the plan of reorganization the company has paid the annual installment on the Seney mortgage due Jan. 1, 1878, amounting to \$206,555.42, and \$36,000 on the contract with the Equipment Company. It has also been found necessary to provide large additions to our terminal facilities and rolling stock, with other items included in the construction and improvement account.

"These heavy outlays, together with the payments above mentioned of mortgage debt, added to the amount paid last year for similar purposes, with \$151,605.46 expense of organization, have involved the employment of a large sum in addition to the net earnings of the road. While these advances have reduced the mortgage debt and added largely to the earning capacity of the road, they have rendered it

necessary to provide for payments which were not expected to be met from the net earnings. It will also be necessary during the current year to make further additions to our side-tracks, purchase other grounds, erect some new buildings, and also to provide a large number of cars in addition to those built during the past year. To meet these requirements and provide for the balance of the Seney mortgage, it is recommended that a mortgage of \$2,000,000, covering the entire road and equipment, should be executed, and that a special meeting of the stockholders should be called at an early date to obtain the necessary authority. (This has been done.)

"Interest on all the mortgage bonds has been paid at maturity, according to the funding plan. During the present year payment of coupons on the entire debt of the road will be resumed, and the fixed charges will be increased by the additional coupons of the consolidated mortgage. The prospective business of the line warrants the anticipation of sufficient net earnings to meet these charges, but the installments on the principal of the debt, and the additions to our equipment, must be arranged in such a way as to permit gradual payments, according to the growing resources of the line.

"The Hannibal & Naples road, heretofore operated by this company, under a lease at \$35,000 per annum, it is now proposed to consolidate with the Wabash, by issuing mortgage bonds upon the leased road. These bonds, amounting to \$500,000, at 7 per cent. interest, impose no new burden upon the company, but simply change the form of the contract, and the Wabash Company thus succeeds to the ownership of the road by paying interest on \$10,000 per mile. As an important part of our trunk line to the Mississippi River, the wisdom of this acquisition can scarcely be questioned."

### St. Louis, Kansas City & Northern.

This company owns and works the following lines:

	Miles.
St. Louis to Harlem Junction, Mo.	265.50
Northern Division, Moberly, Mo., to Iowa line.	87.50
Union Depot Extension, Ferguson to St. Louis Union Depot.	11.00
Glasgow Branch, Salisbury, Mo., to Glasgow.	15.00

Total owned.	379.00
Han. & St. Joe, Harlem Junction to Kansas City.	9.00
St. Louis & Cedar Rapids, Iowa line to Ottumwa, Ia.	43.25
Boon County & Booneville, Centralia, Mo., to Columbia.	22.00
St. Joseph & St. Louis, Lexington to St. Joseph, Mo.	76.25
	150.50
Total worked.	529.50

The report is for the year ending Dec. 31, 1878. During the year the company has acquired control of the Brunswick & Chillicothe road, from Brunswick, Mo., to Chillicothe, and the St. Louis, Council Bluffs & Omaha, from Chillicothe to Pattonsburg, 42 miles. Both were at one time worked by this company under lease, but afterward surrendered.

The general account is as follows, condensed:

Stock (\$65,325 per mile).	\$24,000,000.00
Bonds (\$27,302 per mile).	10,381,500.00
Profit and loss, St. L., Ottumwa & Cedar Rapids.	538,000.00
Supplies and receivables.	881,870.55
Bills and accounts payable, less cash on hand.	
Total.	\$35,801,470.55

	1878.	1877.	Inc. or Dec.	P. c.
Road and construction accounts (\$90,456 per mile).	\$34,434,244.11			
Stocks owned.	786,244.00			
Profit and loss—preferred stock.	152,610.50			
Supplies and receivables.	161,346.93			
Income account, debit balance.	257,024.99			
Total.	\$35,801,470.55			

Of the stock \$12,000,000 is preferred and \$12,000,000 common stock. The bonded debt consists of \$6,000,000 first-mortgage bonds; \$2,993,000 real estate and railway mortgage bonds; \$1,000,000 St. Charles Bridge first and \$383,500 second-mortgage bonds. The \$1,388,500 St. Charles Bridge bonds appear in the account for the first time.

The earnings for the year were as follows:

	1878.	1877.	Inc. or Dec.	P. c.
Freight.	\$2,336,257.87	\$2,208,120.50	I.	\$128,137.37
Passenger.	853,904.16	804,319.57	I.	49,584.59
Mail, express, etc.	134,333.61	134,733.49	D.	399.88
Total.	\$3,324,495.64	\$3,147,173.56	I.	\$177,322.08
Expenses.	1,976,995.72	1,896,400.42	I.	80,595.30

	1878.	1877.	Inc. or Dec.	P. c.
Net earn.	\$1,347,499.92	\$1,250,773.14	I.	\$96,726.78
Gross earn. per mile.	6,278.50	5,943.65	I.	334.91
Net earn. per mile.	2,544.85	2,302.18	I.	242.67
Per cent. of exp.	59.47	60.25	D.	0.78

During ten months of the year double daily trains were run over the Northern Division to Ottumwa, and a through sleeping-car line between St. Louis and St. Paul was run. Expenses were increased by heavy renewals on the St. Joseph Branch and the St. Charles Bridge.

The income account for the year was as follows:

	1878.	1877.	Inc. or Dec.	P. c.
Net earnings.	\$1,347,499.92	\$1,250,773.14	I.	\$96,726.78
Rent of tracks.	7,823.30			
Paid account, earnings.	50,437.71			
Profit and loss.	1,084.53			
Total.	\$1,406,845.46			

	1878.	1877.	Inc. or Dec.	P. c.
Interest.	\$681,442.41			
Rent of roads.	275,820.63			
Repairs, Han. & St. Joe track.	13,778.78			
Rent of box cars.	985.00			
Use of foreign cars, balance.	21,033.91			
Sundry accounts and expenses.	83,656.50			
	1,086,723.23			

	1878.	1877.	Inc. or Dec.	P. c.
Surplus for the year.	\$320,122.24			
Debit balance, plus old taxes paid.	577,149.23			
Debit balance at close of year.	\$257,024.99			

	1878.	1877.	Inc. or Dec.	P. c.
Mileage of:				
Locomotives.	2,770,428	2,503,048	I.	266,480
Passenger-train cars.	3,559,636	2,455,430	I.	1,085,206
Freight cars.	27,855,793	23,591,855	I.	4,263,938
Tons freight carried.	690,460			
Tonnage mileage.	187,290,870			
Average rate per ton per mile.	1.250 cts.	1.444 cts.	D.	0.194

Cost of locomotive service was 17.29 cents per mile, against 17.69 in 1878. Cost of car repairs for passenger-train cars, 1.55 cents; freight cars, 0.43 cent per mile run.

Freight carried to St. Louis was 460,776 tons; shipped from St. Louis, 166,746 tons. The road has been gaining steadily as a carrier to St. Louis, and last year brought the heaviest tonnage of any of the roads, lending for the first time.

Renewals and improvements included 264 feet truss bridge and 8,921 feet trestle. There were 44.98 miles of steel rails laid, and 313,899 ties; 21,668 feet of new sidings were built. Expenditures on construction account for the year were \$177,219.29.

During the year the St. Charles Bridge stock was exchanged for this company's second-mortgage bonds, and ar-

rangements have been made to replace the 10 per cent. bonds of the bridge with this company's bonds bearing 7 per cent. for three years and eight afterward.

The rental charges have been reduced from \$528,500 in 1874, to \$249,800 in 1878. Concerning the Omaha line the report says:

"Upon the first of August last we secured the perpetual control of the Brunswick & Chillicothe Railroad, in consideration of this company promising to pay the interest upon \$304,500 of bonds owned by that company, at the rate of 4 per cent. per annum for three years, 6 per cent. for 19 years thereafter, and 8 per cent. per annum for the next three years.

"About the same time we arrived at a settlement of the difficulties which had for so long existed between this company and the bondholders of the St. Louis, Council Bluffs & Omaha Railroad Company, by an agreement which provided that the amount of their bonded indebtedness was to be reduced from \$987,000 to \$626,000, and the ownership of the road secured to this company, on our agreeing to pay 4 per cent. per annum interest upon said bonds for five years, and 6 per cent. per annum thereafter, and to issue to the bondholders, in settlement of all claims for past due interest, \$100,000 in freight certificates, redeemable in one-fourth payment of freight bills for freight coming to or going from our line over the St. Louis, Council Bluffs & Omaha Railroad.

"By these arrangements the control and ownership, upon most favorable terms, of the line of road from Brunswick to Pattonsburg was secured, but terminating on the very entrance of the most fertile section of our state, the value of the new branch depended upon its being extended, and your managers at once commenced the consideration of the practicability and feasibility of such an extension through to Council Bluffs or Omaha. With that object in view, a careful inspection of the character and resources of the country to be traversed by such a line was made, together with prudent estimates of the cost of construction, and the advantages to be derived from such a connection promised to be so large that its completion seemed to be a matter of the greatest importance to this company, and we are now able to report that negotiations have been so successful, and have progressed so far, that the enterprise is now in such a shape that we are justified in assuring you that the road will be built during the coming year, as sanctioned by the written approval of over three-fourths of your number, under date Jan. 14. This new line will, we believe, be the most remunerative portion of your road, and greatly enhance the value of your present property."

### Chicago & Eastern Illinois.

This company, successor through foreclosure to the Chicago, Danville & Vincennes, owns a line from Dolton, Ill., southward to Danville, 114 miles, with a branch from Bismarck to Coal Creek, Ind., 24 miles, 138 miles in all. It leases the use of the Pittsburgh, Cincinnati & St. Louis tracks from Dolton to Chicago, 21 miles. The first report of the present company is for the year ending Aug. 31, 1878.

The equipment consists of 28 engines; 8 passenger and 7 baggage and mail cars; 327 box, 74 stock, 679 coal and 12 caboose cars; 1 pay, 5 tool and service and 79 gravel cars.

The general account at the close of the year was as follows:

Stock and scrip (\$2,413 per mile).	\$333,054.18
First-mortgage bonds (\$21,739 per mile).	3,000,000.00
Income bonds and scrip (\$5,175 per mile).	714,154.16
Bills payable, accounts and balances.	210,510.39
Income account, balance.	115,718.50
Total.	\$4,373,537.23

	1878.	1877.	Inc. or Dec.	P. c.
Road and equipment (\$28,820 per mile).	\$3,949,594.15			
Cash, materials and receivables.	103,743.08			
Bonds on hand.	320,200.00			
Total.	4,373,537.23			

The authorized amount of stock is \$500,000; first-mortgage bonds, \$3,000,000; income bonds, \$1,000,000. The stock, income bonds and \$2,499,000 mortgage bonds were issued under the agreement of reorganization; \$181,000 mortgage bonds were sold.

The traffic for the year was as follows:

	1877-78.	1876-77.	Inc. or Dec.	P. c.
Train mileage:	187,778	187,778		
Passenger.	197,419	197,419	I.	15,285
Freight.	381,365	348,862	I.	32,503
Service and switching.	301,404	193,938	I.	107,466
Total.	880,843	740,219	I.	124,624
Passenger carried.	111,058	105,725	I.	5,333
Passenger mileage.	4,029,197	3,683,319	I.	345,878
Tons freight carried.	498,127	444,062	I.	54,065
Tonnage mileage.	56,898,633	40,219,338	I.	7,649,295

	1878.	1877.	Inc. or Dec.	P. c.
Av. train load:	22.13	18.66	I.	3.47
Passenger, number.	149.15	141.07	I.	8.08
Freight, tons.				5.7

Per passenger per mile. 2.75 cts. 3.